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# THE ELECTRIC UNIVERSE

EDITION   
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## 4.6 CORONA AS POSITIVELY CHARGED EMISSION

**Corona, prominences and flares** have not only a similar loop form but there are many other similarities:

- They contain ions.
- Their matter differs from the solar matter (table 4.10) by having too much iron and magnesium, for example.
- They have strangely a spectrum-maximum in X-ray or even in gamma; they generally emit strong photons and almost no heat essentially differing from the Planck-law. This emission is, since 1941, explained as being caused by their high temperature from 10 000 K up to the incredible 1 GK.
- Their incredible high temperature was also tested via Doppler-broadening. But the high "temperature" was not confirmed ! The broadening was greater than expected. This broadening showed a four times higher "temperature" than that which was suggested by the ions.
- They can "fall upwards" from the Sun.
- They have an important common factor: they have no physically clear model since decades. They should all be heated somehow by magnetic fields, but this is theoretically impossible due to the Lorenz-force.

**Stix (1991 p 323):** "The hot corona requires energy to be pumped from low to high temperature. We shall see below that even today the problem of coronal heating is far from a satisfactory solution."

The solution below is a model which describes the corona in all details as an electric event which does not requires a heat-pump.

Moreover: a very strong proof of the electric principle is that the electric models of X-ray bright point, corona, solar loop, prominence and flare are almost the same. These solar events have different names and were described by different experts, but - I am sure - they function electrically and therefore differ from each other, only quantitatively and not essentially. Their similarity will be clearly explained below through their same electric nature. They are all caused by emerging proton bubbles of different proton-concentrations.

### THE WRONG MODEL OF THE CORONA

The first X-ray pictures showed the corona as a very hot and blazing fire. Skylab took many thousands of X-ray pictures and none could show a single coronal loop (4.78). The spectroscopy confirmed this fire-model. The clear detection of strong ions showed exactly the temperature of the different areas e.g. 1.8 MK in the presence of Fe XIV-ions. The corona-model as a solar fire of a temperature above 1 MK was born.

But this idea was an important and significant error. It blocked and still blocks the discovery of the electric functions of the Sun. Many properties of the Sun and of the Universe could not be understood (see table 4.9).

The first question revealed this: what can heat the corona so strongly up to 1-10 MK ? The solar surface is too cold for this task. There were no volcanoes seen which spewed this hot matter from the depth. All astronomers emphasize this contradiction with thermodynamics but so far no model is known which can solve this contradiction.

The solution of this contradiction is that the corona is not hot **but positive. No heating is necessary !** Its ions simply come into existence electrically and not by high temperature (4.16). The new X-ray pictures by Yohkoh reveal the corona as a system of clear coronal loops and no wildly blazing fire. No wild and uninterrupted high-temperature-explosion of these about 240 delicate filaments (3.21) is imaginable since Yohkoh's revelation (TRACE 4.12A).

The corona was already shown in the chapter on solar current as the sum of flux tubes which are emitted from proton bubbles (1.09). Its model will be used here to explain many observations.

- The Skylab-curve 4.15 is explicable. The emerging proton bubbles produce solar loops, prominences, coronal loops or flares if they have a higher and higher concentration of free protons. Emerging proton bubbles of average concentration produce e.g. Fe XIV ions in themselves and in their vicinity after cooling down in the hydrogen layer by the shooting of free protons (4.16). These Fe, Ni, Mg, Si-ions are strongly repulsed by the proton bubble (1.09). As they elevate, they form a coronal loop, in which the ions are the quickest at the start and the slowest on

#### **4.80 Do these curves show thermal equilibria of coronal ions ?**

**Roughly, higher ions show higher computed temperatures. But there are important exceptions which refute a thermal origin:**

**Curve 16 of the neon-like, very stable Fe XVII ions intersects the curve 13 at 1.8 MK and 40%. But where are the coronal loops with these 40-40% abundances of these Fe XVII and Fe XIV ions (4.15 and 4.12A) ? Moreover, curve 16 lies high above the curves 13,14,15 and 17 up to 4.5 MK. Fe XVII should appear deeper than Fe XV but it does not ! Its high abundance and its biggest loops without lower ions are electrically clear. Helium-like oxygen (O VII) shows the same rule.**

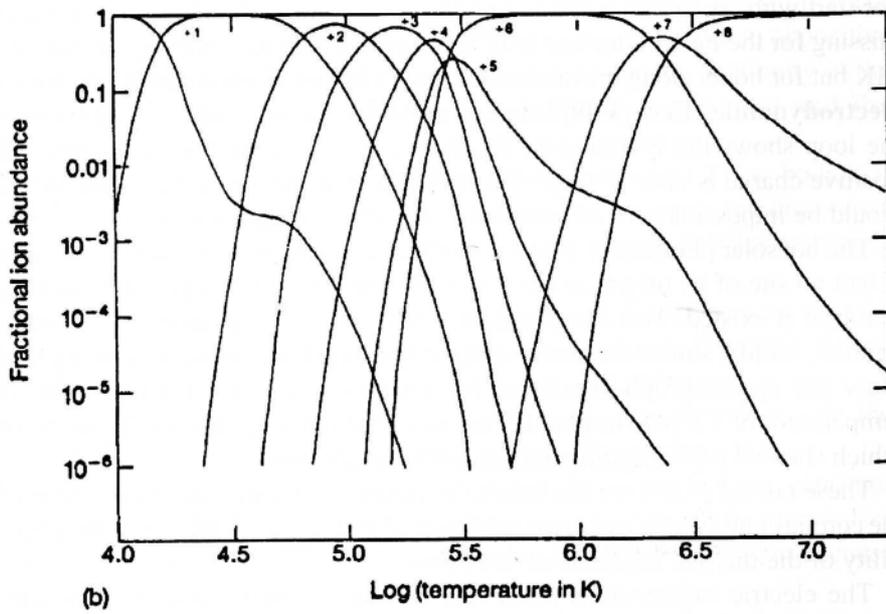
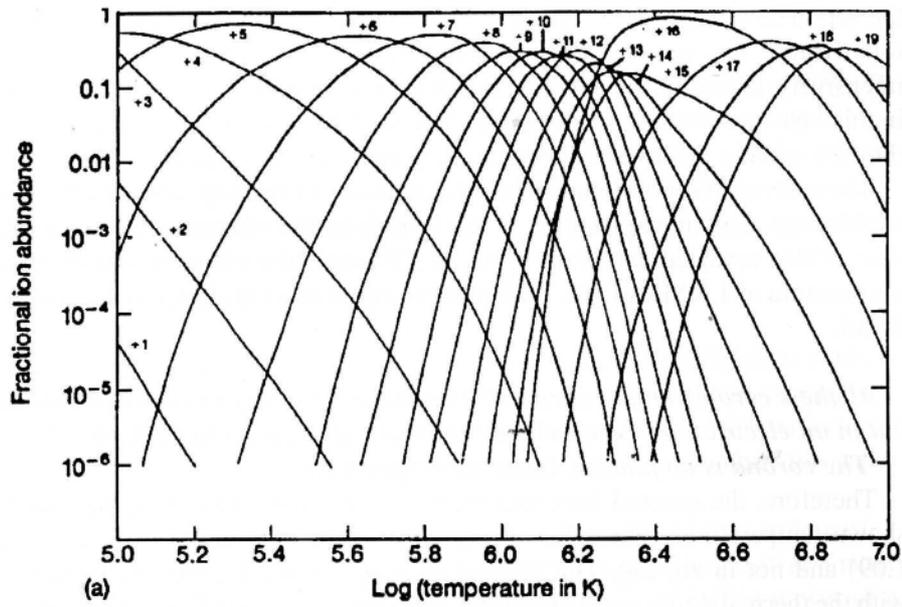


Fig. 5.6 Ionization equilibrium ratios for (a) iron, (b) oxygen ions. Both the vertical (fractional ion abundance) and horizontal (temperature) scales are expressed logarithmically. (Arnaud and Rothenflug (1985))

the top. The stronger ions elevate higher in their coronal loop than the weaker ions from a less dense proton bubble. Therefore the stronger ions are most intensively detectable in upper levels of the corona but they do not exist constantly in this layer. As curve 4.15 shows, the different atoms have no different layers if they are equally positively charged as e. g. FeX, MgX and SiX ions.

The form of questions emphasizes the necessity of the step from description to explanation. E.g. an explanation of the heating of the corona is due since 1941, since Edlén revealed coronium as an Fe XIV-ion, with the typical equilibrium-temperature of 1.8 MK (4.80). Each answer shows another aspect of the corona in detail.

*All these coronal ions in curves of 4.80 do not come into existence in a thermal but in an electric way via accelerated protons (as a target in CERN).*

*The corona is no plasma, it has no temperature.*

Therefore, the spectral lines exactly show these ions but not the here in 4.80 shown temperatures. These ions fly parallel to the axis of the flux tube (3.21, 1.09) and not in zig-zag. The thermal equilibrium and the electric equilibrium with the thermally torn e.g. 13 electrons are simply missing ! These 13 electrically torn electrons were attracted by the proton bubble in the hydrogen layer and did not start with "their" Fe XIV-ion into the coronal loop. The torn 13 electrons are missing for the Fe XIV-ion not only for microseconds as in the hot plasma of 1.8 MK but for hours along the orbit of this ion. **The hot plasma could not have the electrodynamic effect (1.09) because of its electric neutrality.** The existence of the loop shows the existence of an electric charge of its moving matter. Their positive charge is clear through the emission of X-ray (as at each anode) which would be impossible at a cathode i.e. at negatively charged matter.

The hot solar plasma of 1.8 MK was always a basic contradiction in astronomy. It had no site of its origin on the Sun and it would explode immediately as a H-bomb, if it existed. This hot plasma has not a trace of similarity to the ordered, parallel, "cold", almost electronless flight of ions in the coronal loop of my model. Only the spectrograph simulated for decades that the corona is a fire of a temperature of 1.8 MK or hotter. This was confirmed by the first X-ray pictures which showed a blazing fire and not the beautiful loops.

These curves (4.80) are the base of the thermal explanation of the corona, but the corona comes electrically into existence. These curves clearly show the impossibility of the thermal explanation see below.

The electric explanations below are new and simple. Only physics and no "special solar plasma-physics" is necessary for these explanations. For example, the "coronal plasma" cannot contradict physics emitting X-ray but no heat because this "coronal plasma" does not exist.

#### 4.6.1 Wind and corona

Why are wind and corona so very different ? Should the only difference between them be that the wind is caused by open magnetic fields and the corona by closed magnetic fields ? Is the wind a **plasma** with a temperature of 2 MK and the corona a **plasma** of 1.8 MK (in the case of the most typical Fe XIV-ions) ?

All the differences can be physically deduced from the only but basic difference, that **the wind is negative and the corona is positive.**

**They are as different as water and fire (table 4.10).**

- Carriers of the positive and negative electricity have very different masses. A proton is already 1836 times heavier in the solar gravity than an electron; other ions are up to 100 000 times heavier. A certain density of free electrons causes a 1836 times higher acceleration of the expansion than the same proton-density. The escape velocity can be therefore surpassed by electrons unequally easier. The negative charge statistically escapes the Sun and the positive matter statistically remains at the Sun. The corona needs a special big power of a flare to escape with its heavy ions.
  - Also the concentrations are very different. The corona rises from small concentrated proton bubbles (3.21) which have only a small store of positive charge. The corona is a local process. It does not have the continuity of the wind which has an infinite store of electrons in the core and the thermoelement effect which never stops lifting electrons.
  - So the wind never stops. But the corona consists of short living bodies. It always forms new flux tubes from a new point of the surface and disappears again. It is controlled by the same rhythm as the proton bubbles appearing and expanding into the loops.
- Oppositely, the large negative areas with their constant density of  $10^{14}$  electrons/m<sup>2</sup> in each second do not make possible the forming of flux tubes. The wind does not have such loops as the corona.
- The wind explodes continually. The corona does not explode due to the electrodynamic attraction among the ions in its flux tubes (1.09).
  - None of the flows of electric charges is hot. Therefore, neither wind nor corona has a thermal light. But the wind remains invisible because it repulses electrons. The corona lights via recombination, in many wavelengths because it attracts electrons.
  - The wind contains light particles which are easily dragged along by the continually exploding light free electrons from the hydrogen layer. The corona contains heavy ions because these have a higher repulsion above a positive area than light ions as e.g. He II.

- Corona and wind exclude each other not only electrically but also mechanically. The elevated heavy coronal ions would inhibit the emission of the light wind. Similarly, the terrestrial clouds do not allow the photons to pass through, therefore, the earth remains warmer when the nights are overcast.

Oppositely, the heavy positive ions cannot start from a negative area (i.e. from a coronal hole, which attracts them) even in the case of a thermal ionisation. These, non-starting heavy ions remain in the negative photosphere and leave the space free for the emission of the light wind-particles which are ejected by the exploded free electrons.

**Table 4.10: wind and corona**

	<b>WIND</b>	<b>CORONA</b>
charge:	negative	positive
matter:	e,H,H-,He	C,Mg,Fe,Ni
particles:	light	heavy
relation to the Sun:	escaping	remaining
relation to cosmic rays: (Forbush)	attraction	repulsion (2.02)
relation to ion-tail:	attraction	?
site of origin:	coronal holes (poles)	sunspot regions
behaviour:	continual	periodic
intensity:	constant 10A/km <sup>2</sup>	unlimited
causality:	cause	effect
can stop:	never	for many decades

#### 4.6.2 How does the corona come into existence?

- The proton bubbles emerge with the whirls into the active areas. They become colder than 13 000 K (6.03) and each free proton repulses all free protons. The radially diverged velocities of these exploded protons are similar to the quills of a disturbed hedgehog. These velocities will be higher and higher due to the constantly existing repulsion force. Therefore each surfaced proton bubble is a source of many ions. Many proton bubbles together cause later

a whole positive active area (yellow in 3.21 or in map 3.20). Coronal loops grow out from these positive centres. Loops and their sources reveal their positive charge through emission of X ray (3.21).

- Magnesium, iron, silicon have a higher abundance in the corona than in the photosphere. The heavier particles can be found in a higher level, the lighter ones in a lower level as if the strong solar gravity would lose its power. Furthermore, as if this gravity would turn into an “anti-gravity”. What is the cause? Which force elevates into the corona million of tons of **heavy iron** but only 200 times less **light neon** (Lang 1997)? Incredible: neon has a ten times higher solar abundance than iron. Therefore, neon should have a ten times **higher abundance in the corona and not a 200 times lower one!** The cause of this “antigravity” is the electric force. Neon is a noble gas, it almost cannot be ionized. It remains in the positive photosphere mostly neutral, it will not be elevated electrostatically as iron which is easy to ionise. Neon has an electron structure which is more stable than that of iron and magnesium which are easy to ionise. Hence, more iron, magnesium, nickel are in the corona than neon which is 2-4 times lighter.
- The stronger positive ions are repulsed (4.15) stronger electrostatically. The heavier atoms such as Fe and Mg are in a higher level of the corona not because they are heavier, but because they have lost more electrons. After the loss of, for example, 13 of these electrons, they have a 13 times higher electrostatic repulsion over the same positive surface-area than helium which lost only one electron.
- The corona is not only in this model macroscopically positive. Spectroscopical measurements suggest the same. Interestingly, Phillips finds a long interval of the coronal ions without disturbance. Otherwise, the forbidden green light of iron at 530.3 nm could never have been observed. He estimates (p 155) that “electron or ion may travel thousands of kilometers between successive collisions”. He wrote that the electron density should be extremely low in the corona.
- The positive charge of the photosphere makes the ionization process easier. The torn electrons are attracted by the positive surrounding and leave the atom easier than in a neutral surrounding.
- The accelerated free protons ionize, for example, the Fe atoms not only by their positive charge but also by their velocity gained by an electrostatic repulsion, similar to the process in CERN. Free protons repulse free protons.
- The recombination of these ions is retarded because the torn electrons are held by free protons.
- The lower layers of the corona - especially those of the chromosphere under the altitude of 2 000 km (4.15) - are denser. But the emitted high-velocity

ions are rarely stopped in these low layers of a density of  $10^{-12}$  kg/m<sup>3</sup>. The causes are:

all ions move upwards, only the velocities are different

all ions are positive, each ion repulses each ion (4.17).

- During sunspot-maximum, the very strong positive charge (sent by the core) produces a very strong corona above the surface. The cause of it is not the stronger magnetic fields nor the slightly higher temperature of the photosphere, but the higher number of proton bubbles and a stronger electrostatic repulsion due to the stronger positive charge. This corona reaches altitudes of millions of kilometers, more than 10 times over the altitudes reached in sunspot-minimums. A strong corona was observed in sunspot-minimum without any magnetic fields on the spotless Sun in 1996 (see question).

## QUESTIONS

### THE NAME, CORONA

- Why is the corona similar to a crown ?

**The non-electric astronomy** sees the corona as made by some closed magnetic fields. But all these magnetic fields together have no crown-structure with peaks but round loop-structures and these fields are not present in sunspot-minimums when the corona seems to be a crown during the eclipse (4.56). The Latin name was obviously given due to this similarity. Corona is crown. Result: The non-electric astronomy cannot explain the name of the corona.

**The electric astronomy** sees the source of the helmet-streamers (4.58) in the positive areas of the solar surface. These areas can be found also during the minimum or out of the 2-3 years of the strong maximum. So - statistically - eclipses mostly show a crown.

These helmet-streamers are formed by the streaming of the solar wind from the south and from the north.

No corona could be seen during the Maunder minimum, when the whole solar surface was very probably almost totally negative.

Cosmic rays showed (4.60) some periodic positive charge, they lowered the strong electrostatic attraction of the negative solar surface. This was observed in radioactive carbon measurements (4.60).

## IS THE CORONA REALLY HOTTER THAN 1 MK ?

Phillips wrote in 1992: "A fundamental, and it must be admitted to a large extent unanswered, question of the solar physics is

### ● **why is the corona so hot ?"**

He estimated the total power of the corona as only 5 ppm of the solar power. His estimation did not start, however, at the necessary power of a heat-radiation i. e. at the coronal-temperatures which are suggested by the coronal ions (4.80). He wrote that perhaps some magnetohydrodynamic waves or electric currents can heat the corona, but he gave no model of their sources or their effect on e.g. the coronal "temperature-distribution" (4.15). (He could not have known in 1992 that SOHO will not find in 1997 these MHD-sources.) He showed, however, the problem of the heating of the corona through the dense chromosphere.

**The electric astronomy considers the question concerning the hot corona, to be wrong.** The high temperature was not directly measured by a "Huygens-spacecraft of the Sun" which would fly into the corona.

The correct question should be directed to the measurement ! The correct question is:

### *why does the corona contain highly ionized atoms ?*

The answer is not because of its high temperature, but because of its macroscopical positive electric charge. Also a proton-beam in CERN is not e.g. 10 000 K hot but positive.

The electric astronomy can show simply the way of these positive ions into the corona and their distribution there:

- the solar core charges itself by the thermoelectric effect
- this positive charge explodes periodically, 11 yearly,
- parts of this positive matter are elevated by the whirls
- the positive charge overbalances the thermoelement-electrons
- proton bubbles electrically explode in the hydrogen layer (4.47)
- the electric explosion of these protons produces e.g. Fe-ions (4.16)
- the stripped electrons were electrostatically retarded
- the positive ions are electrostatically repulsed (4.17)
- the stronger ions were stronger repulsed and fly higher (loops in 4.10)
- stronger positive area emits more and stronger ions (3.21)
- large and weak positive areas emit helmet-streamers (4.58)
- concentrated proton bubbles emit coronal loops

- some positive ions emit X-ray via recombination
- these ions fall again after total recombination as atoms
- these ions as CME explode if a flare electrically explodes (4.95, 4.23 A).

Corona, prominence, flare are all caused by the positive charge in different concentration and amount.

The corona is similar to the cosmic rays, which have not only an assumed, but a **measured** positive charge overbalance over 99.9%. We cannot measure directly the electric overbalance of the corona as easy as that of the cosmic rays, but both have many common characteristics which suggest a similar basic nature.

Naturally, the cosmic rays are much more energetic but a part of the weaker cosmic rays originates at the Sun.

**The common characteristics of cosmic rays and corona are:**

- both contain highly ionized atoms
- both can be explained as being electrostatically repulsed by the positive Sun in maximum (2.02)
- both have a higher abundance of matters (e.g. Mg, Fe), which are easy to ionize
- both show a low abundance of electrons. It is clear for the cosmic rays (see table 4.9). But this low abundance is also clear, indirectly, for the corona: Phillips (1992) described an unexplained, very long undisturbed state of the coronal ions on the base of their "forbidden" spectroscopic lines. A corona of a supposed charge overbalance of zero would have enough electrons to transform these ions immediately to a lower ion or even to an atom. The spectroscopy shows the low abundance of the coronal electrons, indirectly.
- both have abnormal abundances: the heavier elements - e.g. carbon, oxygen - are over-represented, over ten times compared to those of hydrogen and helium.
- Noble gases as neon and argon are under-represented because they are difficult to ionize.

The measurement of the coronal mass ejections by spacecrafts would show the exact relation of the positive and negative charge. If this relation would be e.g. 88% then the corona had e.g. 81% before ejection.

- These common characteristics suggest a similar origin: **the electrostatic acceleration**. The electric models are: the coronal ions are repulsed by the locally positive areas of the Sun whereas the atom-nuclei of the cosmic ray

are repulsed by the most positive electric charge of the Universe i.e. by the neutron star, for some millions of years (M).

● **Why is the corona normally invisible ?**

The corona is visible only during the solar eclipse. Its whole light **is measured** as only 1% of that of the Sun. This small light is overbalanced normally by the photosphere.

But this question, if asked, will show the problem of the magnetic model: If the corona is a hot plasma, it should light as a **hot plasma** of e.g. 2.5 MK. "The Planck-curves do not have intersections" (Wöhl 1996). A strong X-ray alone cannot be emitted by the hot plasma. A much stronger visible light and infrared light should be emitted with the measured X-ray emission.

The corona should be much brighter in visible light than the photosphere ! If this is obviously not observed, either the corona is not hot or the solar plasma does not obey the Planck-law. Strangely, solar physics today supposes a "special solar plasma" which emits only X-ray but without the other weaker photons. This "plasma-physics" mysteriously contradicts the Planck-law ! The Planck-curves have intersections in this "physics".

**The magnetic model cannot explain the invisibility of the corona on the base of physics.**

The argument is not valid that the corona has a low density. It is easy to calculate that the coronal ions would cover totally the whole solar surface many million times. Therefore, if we look at the Sun, we should see only coronal ions sending a blinding, strong visible light on 2.5 MK. But these ions are not hot, they emit X-ray electrically. A calculated experiment below shows that the solar corona according to its magnetic model should have an emission stronger than that of the Galaxy.

**The electric astronomy sees the corona not as being hot but positive.**

The corona does not emit visible light because the Planck-law is not valid for this "special solar plasma" but because the corona is no plasma at all. The corona is no solar plasma and no normal plasma in lack of zig-zag-motion. The Planck-law is, in fact, not valid for the corona, not for a secret reason, but absolutely clearly: the Planck-law describes the heat-radiation and the coronal particles have no heat-motion ! They have no zig-zag heat-motion "trapped in magnetic tubes". They fly parallel to each other on elliptic orbits. They form their coronal loops from the positive photosphere to the negative photosphere. Their Doppler-measured velocity is even twice higher than their alleged thermal zig-zag motion (named "non-thermal motion" by Phillips, see below), but they form no "hot" plasma, nor any other plasma.

The coronal ions are not made by thermal pushes but by the solar thermoelement. This process is based on events in the core and many years before the appearing of the corona. The corona is not hot and therefore normally invisible. The coronal ions survive as ions, not by the means of dynamic equilibrium i.e. by pushes excited again and again, after each recombination, but because they have not enough electrons to be neutralized to atoms. The Fe XIV-ion would attract strongly, first one, then later, weaker and weaker, further 12 electrons. But normally it gets not a sole electron. If one of them gets perhaps one electron, it lights in X-ray.

The corona is invisible, because it is no plasma. It emits only X-ray. As each anode on high voltage, the corona is invisible. As positively charged matter, it would emit also no X-ray if it would get no electrons. Also an X-ray equipment cannot emit X-ray from its anode on 50 000 V if the electron-emitting cathode is burnt out.

During an eclipse, the corona is visible in the forbidden "coronium light" (e.g. in green light of 530.3 nm of Fe XIV) due to high-energetic X-ray photons, which have a small energy-difference in visible spectrum. In this sense, the corona is visible during the eclipse due to its X-ray-photons.

### ● Why is 1 ppm hydrogen not ionized in the corona ?

Phillips describes this "surprising" measurement (p 145) in 1992.

#### **The non-electric astronomy has no explanation:**

The hydrogen can be ionized: Each electron can tear the only electron of a hydrogen atom after an acceleration by 13.58 Volt. 99.7% of hydrogen is neutral at 8 000 K. But only about 8% of the hydrogen nuclei (protons) can hold its electron over a temperature of 12 700 K (Saha-equation). The ionization is almost perfect if the motion-energy of the hydrogen atoms reach the 13 eV. Most of the collisions ionize.

If the corona had its alleged temperature of e.g. 1.5 MK, the fraction of the neutral hydrogen would remain much lower than 1 ppb. It would be immeasurably low. But - unexplained - the spectrum of the corona consists of a strong part of the lines of the neutral hydrogen, stronger than the lines of calcium or argon.

**The electric astronomy describes the corona** as a parallel flight of mostly ionized atoms, but not as gas or plasma. The collisions do not cause an ionization - as in a hot gas - because no collisions occur. Hydrogen atoms are not hit by other particles.

This emission-line is produced by the start of a proton which is emitted electrostatically into the coronal loops and later recombines to hydrogen.

● **Why can the corona not have a very high temperature ?**

The highly ionized atoms of e.g. Fe XV - Fe XXV suggest a temperature of e.g. 2 - 10 million Kelvin.

**The question of the non-electric astronomy concerning the high temperature of the corona** is well known since 1941 (Edlen) but no answer could be found. No model is known to explain the production of these ions by magnetic fields. As shown above in chapter 1.6, the energy density of the magnetic field of the sunspots is by many orders too low for the production of the coronal ions. This calculation will be confirmed below via observations and calculation. Following observations directly show, however, that the corona cannot be a plasma of such high temperature.

- The super-spicules reach sometimes the coronal levels. They should show a form as a stratospheric balloon before start (similar to 4.55) because of the "increasing temperatures" in the corona outwards, but they do not have a higher diameter in these coronal levels than in the photosphere. This is often mentioned as one of the contradictions of the corona.
- The prominences lie for weeks in the altitudes of the corona. No heat-up is observable or measurable.

In both cases, the known answers are:

the corona has a very low density and

the magnetic flux tube around the prominence screens the heat of the corona.

No calculations are shown to prove these opinions.

But the transparent flux tube cannot screen the heat-radiation of the corona, which would be the main part (estimated 99.99%) of the heat-transfer at this temperature of e.g. 1.8 MK. This would result in a cooling of the corona in the vicinity of these alleged "cold" eruptions from the surface. But no lower ions are observed in the vicinity of these eruptions, and therefore, no lower "temperatures". Neither the spicules nor the prominences will be hotter, nor the surrounding layers of the corona will be colder.

- At a H-bomb temperature, the corona should explode and vanish within hours into space.

**The argument is not correct that the hot plasma of the corona is trapped in magnetic "flux tubes". They could not do this:**

- also the very tenuous "high temperature-plasma of the corona" would have a high pressure above 1 MK of about 0.01% of the air on sea-level (= 0.1 millibar or 0.1 hectopascal). The pressure-force would be stronger than all supposed strength of the magnetic wall of these "empty magnetic tubes"

- the wall of the dynamo-made, empty “flux tubes” would have a natural repulsion in itself - independent of its content, even in empty state, too. It would magnetically explode because each force line repulses each force line of the same direction. (The non-electric astronomy did not present a single model for the “flux tube”). No pressure of the “high-temperature-plasma of the corona” inside would be necessary to destroy such a “flux tube”.

**According to the electric astronomy**, the corona is no high-temperature plasma. The corona is a positive solar current, which has its own magnetic field (Lang 1995) as each electric current (chapter on flux tubes). Disaccording to the idea of the non-electric astronomy, a real flux tube is made by streaming of positive ions. These ions are not particles of a plasma. They do not press against “the magnetic wall of a magnetic tube” similar to water filled into an empty glas tube, but oppositely, these ions electrodynamically form the flux tube. Parallel currents attract each other making the cross section of the flux tubes as small as possible. The ions make their flight in a very characteristic round cross section as the electrons in terrestrial lightnings (Photo lightning 4.25).

The existence of coronal flux tubes which do not explode shows strongly that the corona cannot be hot. It must be electrically charged since it has an electrodynamic effect (1.09).

#### ● Why can the corona not conduct 20 times stronger than copper?

Do the coronal electrons conduct the heat 20 times stronger than Cu ?

Lang (1995 p 112) shows this conductivity as the explanation of the fact that the corona does not explode with its 1-10 MK-temperature. According to him, the hot plasma loses its energy by heat-conduction via these relativistic electrons of a supposed high-temperature coronal plasma.

The calculated high velocity of these coronal electrons in range of 10 000 km/s would be in fact clear by the Boltzmann equation, but there are two essential problems:

- if these electrons are very quick in a plasma of a temperature of e.g. 2.5 MK, they would produce an enormeous thermoelement effect. They would run into the cold foot points of the coronal loop. The electrostatic repulsion of the positive ions, which lost their electrons, would additionally increase the pressure of the “hot plasma” in the flux tube. These tubes would explode electrostatically immediately.
- the corona would lose too much heat-power. A simple calculation shows that this enormeous heat conductivity of the coronal electrons

$$8 \text{ kW}/(\text{m K})$$

would produce a heat transport of 20 kW/m<sup>2</sup> from the corona. The corona has a power of about 1 ppm of the solar power (Ph p133), i.e.

$$0.000\ 001 \times 63\ \text{MW/m}^2 = 63\ \text{W/m}^2$$

This is about 300 times lower than the power-density of the heat-conduction via electrons. The coronal electrons would conduct all power of the corona into the photosphere. This heat-conductivity would not only inhibit the heat-explosion of the corona as expected, but also the coronal "high temperatures". The corona would die before even being born.

- not a trace of a hot point in the photosphere is measurable because of this supposed enormous "super-copper-conductivity" of the coronal loops. A long coronal loop of e.g. 2.5 MK should give all its warmth to these small volumes of both foot-points and heat them up to e.g. 2.4 MK ! This part of the photosphere would emit heat as all other 6000 K-parts of it but  $[2\ 400\ 000\ \text{K}:6000\ \text{K}]^4$  - times stronger. This footpoint would melt the Earth (see I)!

### Electric astronomy shows

- that these quick electrons do not come into existence thermally at the temperature of 2.5 MK. Such free electrons, or bound electrons of a plasma do not exist in the corona. The ions exist alone and not in a plasma. The corona is a parallel flight of heavy ions exactly as is observed. The presumed other electrons are not present, **these electrons can therefore produce**
  - no heat-conduction
  - no neutralisation (or screening) of the ions
  - no hindrance of the electrodynamic effect and therefore a hindrance of the forming of a flux tube
  - no strong pressure on the "magnetic wall of the presumed flux-tubes" which are not secretly somehow produced by the non-existing solar dynamo but by the electrostatically emitted coronal ions themselves.

There are few cold, thermally emitted electrons by the photosphere of 6 000 K or those from the solar wind, sometimes those torn from hydrogen atoms (see loops in two wavelengths: 4.97). Only these electrons exist which release the X-ray and no other electrons which are now supposed to neutralise the observed ions.

Concretely, an Fe XIV ion is accompanied in the corona by only one electron which produce the X-ray wavelength of 5 nm, and not by 13 electrons which should form a non-existing hot plasma of 1.8 MK. Most of the other Fe XIV ions have no electrons, they do not emit photons.

All the vagabunding electrons are attracted electrostatically by "hungry" Fe XIV or Ca XV ions, for example. Shortly before recombination, these electrons can be accelerated to such velocities in the range of 10 000 km/s and produce the

broadening of the lines. They are absolutely not **hot**, nor are they **free** electrons in a neutral plasma of high temperature of zig-zag motion, but electrons on their last course before their cold recombination. They cannot conduct heat because they fly only to their ions and not alone in all directions. They absolutely do not fly from the coronal loops to the two foot-points to heat them.

Also in the case, if somebody should "measure" the photosphere-temperature with the strongly ionised atoms in these foot-points, only one foot-point (at the emerged proton bubble) would have these ions, **not both** (4.81). This X-ray bright point is not the result of the coronal loop, but the electric cause of the whole loop.

This only foot-point (in each loop), if it would be in fact hot (by super-conducting electrons), would emit more heat than many thousands Suns (I).

The assumed hot and free electrons do not conduct heat-power, because they do not exist. They cannot form a dense electron-gas as assumed. They cannot exist free among strong ions of the positive corona as a lamb among hungry wolves. All free electrons are immediately attracted for recombination before they can transport heat.

The electrons do not conduct such heat from the corona, as assumed, because the corona is not hot. The "legs" and footpoints of the coronal loops do not show a strong darkening in X ray and the photosphere does not show a brightening in visible light due to this heat-conduction. No heat-transfer can be found due to these non-existing electrons.

#### ● **Would the coronal ions radiate if we collected them ?**

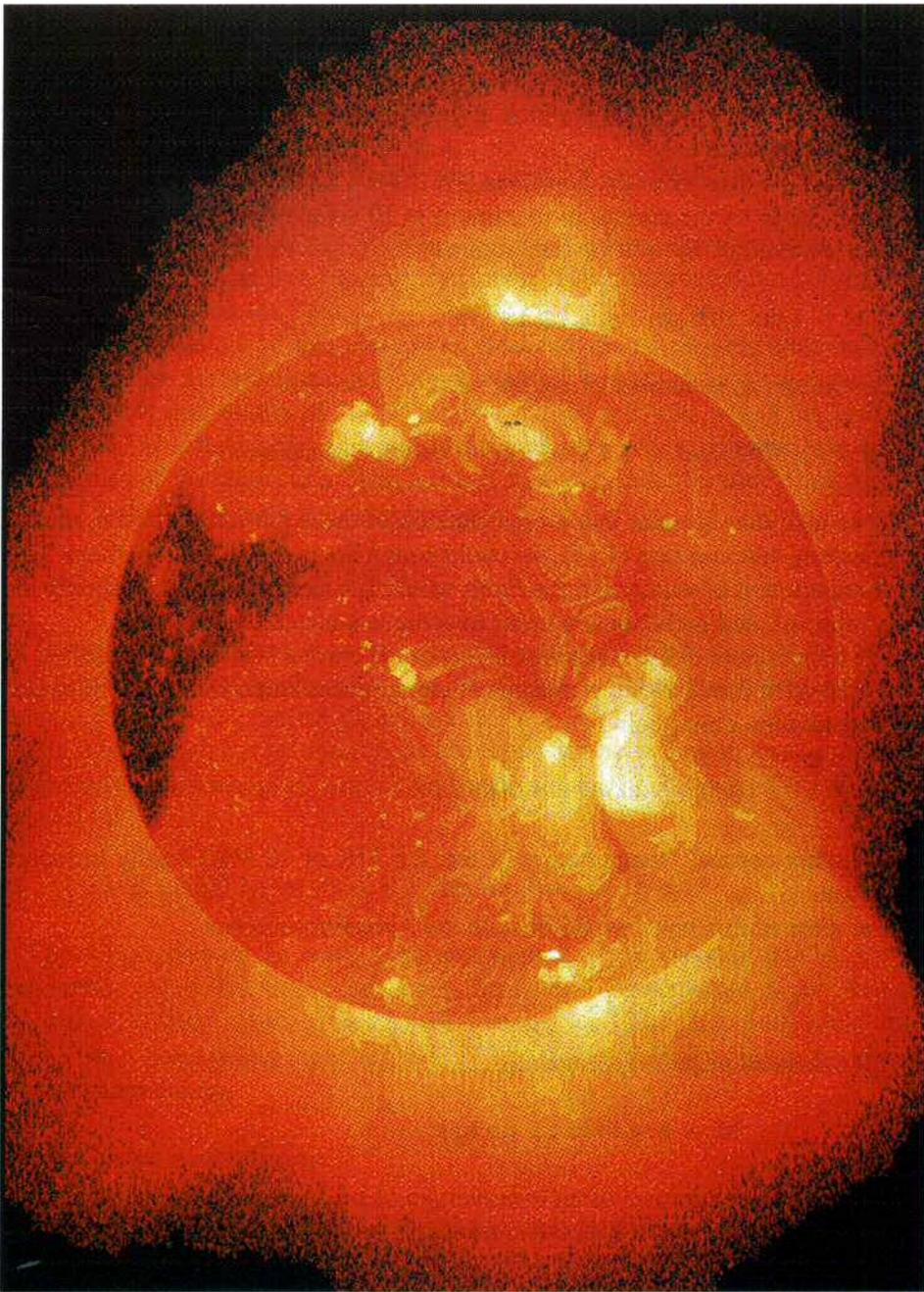
This question is unknown in the non-electric astronomy. The problems with the coronal high temperature are well known. The corona would "vaporize the Earth" (Lang 1995 p 106) if it would be dense, but it is diluted.

The following simple calculation clearly shows that the corona would vaporize the Earth in picoseconds even in this diluted state. The corona does not vaporise us only because it is not hot (Ky 1994).

If we assume that the corona is hot, its heat radiation would be much stronger than that of the luminosity of the Sun. This impossibility proves that the corona cannot be a hot plasma.

#### **4.81 Solar corona in X-ray in 1992 (May 8; north is on the left)**

**This beautiful picture was taken by Yohkoh and shows the coronal loops very clearly. Many X-ray bright points emit loops. The mainly southern solar activity is characterised by the southern dominance of the yellow colour and by the northern large coronal hole (black) which seems to attract the landing of some coronal loops. (Internet Yohkoh homepage NASA)**



Let us theoretically collect all the coronal ions into a plate-ball as big as the Sun ! If we could collect at least a very thin foil from coronal iron, and if we can cover the Sun with it, we would see only hot iron ions of e.g. 6 MK and not the photosphere of 6 000 K when we look at the Sun from all directions.

**Let us calculate !**

The particle density of the corona is (Ph 154):  $4 \times 10^{15} / \text{m}^3$ .

The altitude of the corona in maximum is 10 solar radii. The volume of the corona is therefore  $10^3 = 1000$  Sun volume :

$$1.4 \times 10^{21} \text{ km}^3 = 1.4 \times 10^{30} \text{ m}^3.$$

This means an **n** number of the particles:

$$n = 4 \times 10^{15} 1/\text{m}^3 \times 1.4 \times 10^{30} \text{ m}^3 = 6 \times 10^{45} \text{ particles.}$$

If we take into account that a high fraction of these particles are iron, nickel, magnesium, silicium ions (4.15), we could pour a hot metal layer from them. This ideal experiment of vaporizing the Earth would succeed even if we take only the iron-, chrom-, and nickelions in order to achieve a better steel-quality.

The temperature of the outermost layers of the corona is allegedly 6 million K. This makes the furnace for this imagined casting process superfluous. 6 MK makes the calculation easier being

$$1000 \times 6\,000 \text{ K} = 6 \text{ MK.}$$

The other coronal "temperatures" ( e.g. 2.5 MK or 10 MK) hardly influence the result.

The mass of this layer would be with the Avogadro-number

$$L = 0.6 \times 10^{24}$$

if it consisted of pure hydrogen:

$$M_H = n : (1000 L) \text{ [in kg]}$$

But the corona consists of an overaverage of heavy particles. The M mass of the corona of an assumed average atomweight of 30 is thirty times heavier:

$$M = 30 \times 6 \times 10^{45} : [ 0.6 \times 10^{27} ] = 3 \times 10^{20} \text{ kg.}$$

Let us collect these ions of a hot plasma and roll this mass onto the solar surface of  $6 \times 10^{18} \text{ m}^2$ , we get an alleged very hot ball of 6 MK as large as the Sun.

The thickness of this plate-ball is enough: we get for each  $\text{m}^2$

$$\begin{aligned} & 3 \times 10^{20} \text{ kg} : 6 \times 10^{18} \text{ m}^2 = \\ & = 300 \text{ kg} : 6 \text{ m}^2 = 50 \text{ kg/m}^2; \text{ this means } 15 \text{ mm thick.} \end{aligned}$$

Therefore, this hot ball has no holes. In fact, the X ray pictures in maximum (4.81) show almost no Sun but only its corona. This constructed hot ball has the same surface-area as the Sun.

For the calculation of this enormous heat radiation from this plate-ball, we should estimate the radiation-equilibrium in the real corona. Has it enough particles to interact for the validity of the Planck-law ? If we roll balls with a thickness of 1 atom = 0.1 nm, these balls can interact with each other and equalize the resonance-frequencies of the atoms to a Planck-curve, to a so-called blackbody emission.

How many monoatom-balls can be made ?

$$15 \text{ mm} : 0.1 \text{ nm} = 15 \times 10^{10} \text{ balls.}$$

This seems to be more than enough. The many resonance-frequencies would emit heat according to an almost perfect Planck-law, but these many balls smoothen the spectral lines to a perfect Planck curve.

But this ion-ball has an enormous heat emission according to its alleged high temperature. This emission is much higher than that of the whole solar surface of about 6 000 K:

$$[6 \text{ MK} : 6000 \text{ K}]^4 = 1000^4 = 1\,000\,000\,000\,000 \text{ times !}$$

The supposition of the really high temperature of the coronal ions led to the impossible result that the corona emits heat not 1 ppm of that of the Sun **as measured**, but  $10^{12}$ -times higher power than the Sun ! The plate-Sun would emit even 3 times more power than the Galaxy ! The supposition of a hot corona shows a clear contradiction.

### ***The corona cannot be hot !***

The argument is not valid that the real corona is no plate but a big plasma. The plate-calculation was only necessary to show that the corona could be formed to a complete ball without such holes, which could not radiate. But a diffused radiator is always more effective than a plate-radiator. The real corona has, in addition, a much higher surface-area than the Sun.

Also the rough estimations above play no role. No 15 mm-, but even a monoatom-ball of only 0.1 nm of 6 MK would produce the same radiation of 3 Galaxies. A reserve-factor of 100 000 000 is in the estimation by this way.

The impossibility of the temperature-hypothesis would be also already clear if the corona had a 10% higher radiation than the Sun. The other  $10^{12}$  suns are unnecessary for this calculation; they only give more support for the impossibility of a hot corona.

**Electric astronomy explains the coronal X ray emission** by positive electric charge and not by high temperature. The corona consists of ions and not of plasma. The low number of electrons and their flight in a structure of the flux tubes make possible the survival of this positively charged mass of ions.

This positive matter would explode electrostatically but the positive masses are in motion and are held together electrodynamically (1.09). The coronal ions would immediately explode electrically if they would be stopped.

#### ● **If the corona is so very hot, how does it remain hot ?**

The “very hot” corona would be cold (e.g. 1 200 K) in picoseconds by heat radiation into the empty space and into the photosphere if the “supporting magnetic fields” had a short interruption or strong decreasing.

All the magnetic fields of the Sun which are supposed as a source of the coronal power, could not sustain the necessary power of this radiation of 3 Galaxies (see above). The natural heat emission from the “**very hot**” corona is

- neither observed
- nor can it be powered by the Sun
- nor can it be imagined as being stable for hours without continual powering.

However, the observed solar corona does not give the impression that it is sustained somehow by the Sun with an enormous power.

Oppositely, this corona seems to be survive rather with a very low power which can be **easily and within minutes** enormously increased by the Sun in a CME.

The magnetic fields of the Sun are not very stable, they disappear sometimes. The corona is also not stable, but its strong ions show no sudden weakening down to e.g. Fe III and the corona never falls down to the photosphere as balloons after escaping of their gas. First of all, the corona does not vary contemporary and proportionally to the magnetic fields. In addition, the coronal loops never start from the site of the strongest magnetic field, they never transform the “magnetic arch” of a bipolar sunspot-pair to an arch of the coronal ions.

Oppositely, the corona is often ejected into the space in association with a flare and, during this event, its strong ions show a clear and sudden increasing of their

electric charge up to Fe XXIII ions (Stix 1991), see LASCO of SOHO in 1996 Jan. 15 (4.82).

**The corona is not hot in range of 1-10 MK, it is only positive.** No power is necessary for the sustaining of this positive charge. It emits X-ray from its stored electric energy of its ions. This positive charge does not and cannot emit heat. A flare, which is an electrostatic explosion of a dense proton bubble, can suddenly increase this charge by shooting protons into the corona and cause a CME electrostatically (4.82).

● **If the corona is hot, where are the e.g. Fe VIII and Fe XVII ions?**

**Non-electric astronomy sees the corona as a hot neutral plasma.** The positive charge should be equal to the negative charge. For each Fe XIV-ion, 13 free electrons should exist in the vicinity. These electrons were just stripped from the iron atom. The ionisation and recombination should be in dynamic equilibrium at 1.8 MK (4.80).

But in this case, the probability is not zero that the stripped electrons do not recombine at once: first e.g. 6 electrons then 7 electrons recombine. Fe VIII ion has a probability of about 0.1 % in 1.8 MK. Where are these ions in the spectrum of a loop of 1.8 MK ?

Moreover, the probability of the neon-like Fe XVII ions (with missing 16 electrons see curve with 16 in 4.80) is exactly the same as those of missing 13 electrons. **Curve 16 intersects the maximum of curve 13 ! Where are these ions in the loops of "1.8 MK" ? Coronium should show all lines of Fe XVII ions in the same intensity constantly and also decades ago e.g. during an eclipse ! The missing lines of these Fe XVII ions in the coronal loops of "coronium" Fe XIV-ions (4.10), show the impossibility of the thermal corona-explanation.**

Probably there are loops with XIV ions and other (higher) loops with XVII ions, according to curve 4.15. This clearly shows the lack of thermal equilibrium.

**Electric astronomy shows the positive charge of the corona.** No thermal equilibrium exists. Fe VIII ion does not come into existence in a loop which contains Fe XIV ions.

These Fe VIII ions form a much lower loop which has a top in only about 5000 km (4.15), not in 150 000 km! A loop of Fe XIV ions contains no Fe XVII ions because these stronger positively charged loops are emitted from proton bubbles of higher concentration of free protons and these loops are elevated over a loop with coronium i.e. with Fe XIV ions.

● **Where is the inconsequence of many corona-models ?**

**The non-electric astronomy looks for a corona-model** on the base of the measured power of the corona of only 1% (or 1 ppm) of the solar power. It is easy to find some sound-waves, magnetic waves, electric currents, "microflares" or "picoflares" (E.N.Parker) which would produce and transport somehow this 1% of the solar power into the "coronal plasma".

The constructors of the corona-models seem to assume that all other parameters are not so important if the "heating" of the corona is "clear".

But consequently, the

***predicted parameters of the model***

should be compared to the **measured** parameters. The model is correct if all its predicted parameters are near the measured ones.

But the assumed model: "coronal plasma" would need much more "heating power" than the measured 1 %, even much more than the whole solar power (see above). Already the first, most important, essential model-parameter i. e. the power of the corona (that of 3 galaxies) does not meet the measured one.

The other less important parameters (e.g. thermal motion, heat conductivity by hot electrons, predicted Doppler-broadening in the spectra, deviated abundances) also do not meet the predictions. It would be suprising if these parameters would be correctly predicted by a totally wrong model. A discussion of other parameters can be seen below in this chapter.

This inconsequence has made the discovery of the correct coronal-model impossible. The most important physical parameter of the "coronal plasma" - its heat-radiation or its heating power - would show, since decades, that this hot plasma cannot exist.

**The electric astronomy starts** at the thermoelement effect. The locally and occasionally positive areas are simple physical consequences

- of this solar thermoelement and
- of the explosive solar heat-production in the core.

The X-ray of the coronal ions - and many other astronomic observations (see a small fraction of them in table 4.9) - are the consequences of the fact that the electron has a 1836 times lower mass than the proton. Therefore the thermoelement-effect produces not only a positive corona but also an Electric Universe.

## HOW DOES THE CORONA FUNCTION ?

### ● Why can magnetohydrodynamic-waves not heat the corona ?

**The non-electric astronomy** sees the magnetohydrodynamic (MHD) waves as the waves of frozen-in magnetic force-lines, which are similar to rubber-ropes. The excitation of one end of these “ropes” should run along the elastic force-lines and cause heating and sometimes quick ejection of the solar corona. The calculated velocity of these waves is higher than the particle-velocity of the “solar plasma of the wind and of the corona”. These waves were suggested by H.O.G. Alfvén, Nobel laureate in 1970.

Many problems with these assumed waves are shown in MHD chapter of the solar wind: no source, no manifestation, no effect, no cause of an exclusive direction of its “heating” outwards is known. SOHO did not find the sources of these supposed waves. No exact measurement showed them. These waves would be interrupted and stopped in the non-ionized hydrogen solar layer, even if they existed. Phillips emphasized in 1992 that the denser chromosphere would be heated stronger than the tenuous corona.

#### **MHD waves cannot eject masses.**

Let us examine the following task of the MHD-waves: to eject coronal masses from e.g. 20 000 km into the position in 10 solar radii. The “force-lines” can be “frozen-in” **only in existing plasma**, not in plasma which does not exist along the future course of the corona where only vacuum exists at the start of the ejection. But this corona comes into 10 solar radii with a velocity of 700 km/s only after hours:

$$14 \text{ Mkm} : 700 \text{ km/s} = 20\,000 \text{ s.}$$

The MHD-waves cannot send “plasma” into a vacuum. They must stop at the border of existing “plasma” because they cannot penetrate the vacuum.

*The ejection by MHD waves supposes the result of the ejection. These MHD-waves were necessary to explain the electric wind and electric corona without electricity!*

**The electric astronomy** shows this mysterious “plasma” as charged cold matter without any thermal radiation of the alleged 1.8 MK or 2 MK. No sustaining currents (3.33) can flow around this parallel flying charged matter. No “frozen-in” process is possible, nor necessary to explain the observation. The here suggested electrostatic ejection of the positive corona by a suddenly more positive photosphere (4.95) can function naturally also into the perfect vacuum as happens normally and daily. The MHD-waves were necessary because the old models did not consider electric charges and because the measured velocities (e.g. 1000 km/s) were essentially higher than the particle-velocities (e.g. 50 km/s), even on an

assumed very high temperature of e.g. 1.8 MK. The light velocity of the electric repulsion (300 000 km/s) makes all calculated wave-velocities of supposed MHD-waves superfluous.

Instead of MHD-waves, electromagnetic waves can be found in the Sun. These do not need plasma, they expand also in vacuum. But also these do not solve the problem as will be shown below.

The magnetic field of the e.g. sunspots is a constant field. Like every energy-transformation, also the sunspot emits sine-waves of this field. These run as normal electromagnetic field also into the corona. This "elasticity of the force-lines" were shown more than a century ago by Maxwell: these waves are transversal waves.

But these really existing Maxwell-waves have no influence on the assumed "coronal plasma". If the electrons would be moved by these waves to the right, the ions would be moved simultaneously to the left. The non-electric astronomy assumes a neutral plasma, and therefore the densities of the negative and the positive electric charges should be the same.

#### **No macroscopic motion, no CME,**

only perhaps an energy-release can occur. But the corona is not "hotter" above a sunspot but "colder" (3.27). If the existing Maxwell-waves are without any effect, then the supposed MHD-waves cannot have any ejecting or other effect.

The corona is not hot at all, therefore no supposed MHD-waves are necessary to heat or to eject it (by "overheating").

#### **● How can coronal mass ejections erupt diametrically ?**

The ejected corona cannot function magnetically:

- The ejected corona is not similar to any magnetic field
- The corona can be simultaneously ejected from far areas
- The corona can be ejected diametrically

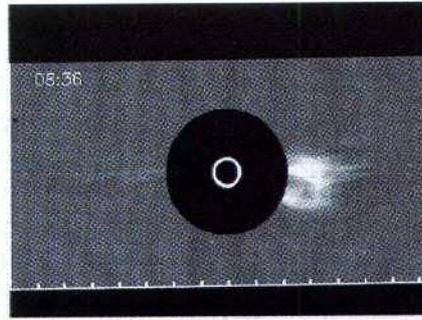
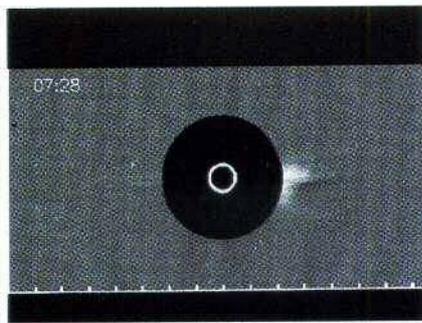
Skyweek reported in 1996 (Sep.20) about a SOHO-measurement (4.82) from 1996 (Jan.15). The corona erupted in sunspot-minimum at the same time on two diametrically opposite solar areas.

**Non-electric astronomy** explains coronal mass ejection as unknown sudden local instability in the "holding magnetic force lines". But in this idea, there are more problems:

- also this coronal mass ejection did not fall back, but it escaped the Sun forever. How can the magnetic field eject the billion tons of coronal masses if it is anchored or "frozen-in" in the solar convective layers (4.04) ?

- If a separation somehow was still possible, the rest of the “frozen-in” flux tube would attract and never emit the emerged loop.
- If a repulsion somehow was still possible due to a never described and non-imaginable conversion of the magnetic poles of the thousand million kilometer long deep flux tube (4.04) which should be frozen in in the solar plasma, the magnetic coronal mass ejection would be still impossible. This long flux tube was not found by SOHO therefore it very probably does not exist. But if we suppose that it separates itself from the coronal loop and makes a rotation in the depth of the Sun as swimmers at the end of their lane at the wall during a championship, this now antiparallel frozen-in flux tube could not repulse the frozen-in dipole of the coronal loop. After a short flight, the alleged frozen-in **dipole in the erupted corona** should “feel” the ejecting dipole and turn with  $180^\circ$  and return via magnetic attraction (4.83) and solar gravity to the Sun.
- No ejection is magnetically possible at all (4.83) and not in the case of the corona. Only the e.g. northern pole of an infinite long dipole could eject the northern pole of another infinite long magnetic dipole. But the coronal loops are not infinite long. Neither the deep flux tube nor the coronal loop is a magnetic monopole, both are dipoles.
- Even if, the coronal loop were somehow converted from magnetic loops, it did not escape in form of a loop. The corona was transformed to a structure of an exact straight, like a radial flying pillar, without any similarity to a “magnetic loop” within an hour after the ejection (4.82). Where are the northern and southern poles? Which pole repulses which pole? No answer is given, nor is one possible. Therefore a model of a “magnetic loop” would be only a short-lived explanation of only an hour.
- The magnetic fields should have a communication in distances of millions of kilometers, in order to repeatedly release the two ejections at the same time, as Skyweek reported. But no such communication could be found.
- Even if an unknown communication existed, why did these ejections start from almost diametrically opposite areas and into almost diametrically opposite directions? The random probability of these events is zero.
- why do such big CMEs occur exactly in the sunspot-minimum, when no magnetic fields should exist? No sunspot could be seen in 1996 between Jan. 6<sup>th</sup> and Jan. 27<sup>th</sup> from my observatory. The started loop was about 20 million kilometer long.

**Electric astronomy** explains the corona via its positive electric charge and not via its weak magnetic field. Normally, corona appears in active areas together with the strong magnetic fields of the sunspots, but it appears sometimes outside active areas. This observation proves that the corona is not caused by these fields.



#### 4.82 SOHO showed diametral CMEs in 1996 Jan.15

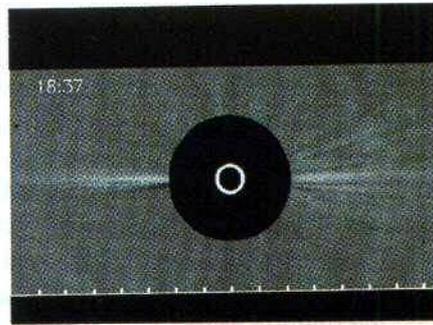
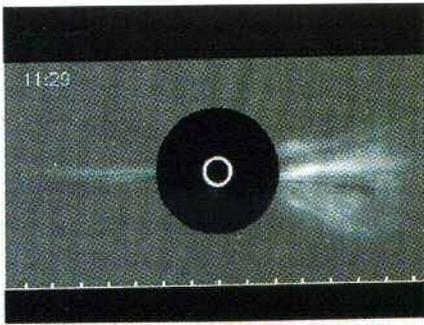
The Sun (white circle in the centre) is covered with a larger disc. The film started 6:00. Already one hour later, both ejections in

The strongest magnetic field of a bipolar sunspot and even the supposed “dynamo” is a “small and slow worm” compared to the ejected big, suddenly exploded, radially escaped loop (4.82). The Sun is rather a small “bottle” from which a powerful and giant “genie” comes out. If Parker and Babcock had seen this series of pictures, they would never have thought of a dynamo. Many astronomers have already discarded this magnetic model.



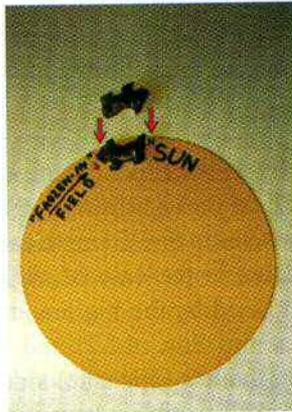
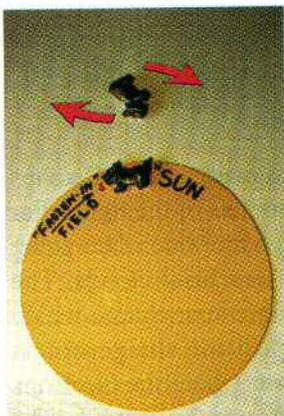
#### 4.83 “Magnetic” coronal mass ejection in experiment

This process can be experimented with two permanent-magnets (here in form of dogs). Even if a repulsion would be possible, the magnetically ejected loop (dog) will rotate immediately. The rotation is here inhibited with two



equator are visible. Strong loop of a length of about 20 solar diameter (see scale down) transforms itself later and flies away as a straight equatorial pillar.

Coronal loops never start at a sunspot (Lang 1995). The corona is caused by emerging positive electric charge (4.81), also in this famous CME of 1996 Jan. 15<sup>th</sup>. A magnetic field is never necessary for the corona; the lacking of sunspots does not hinder the appearance of the corona. The corona is not a magnetic but an electric event. Proton bubbles can emerge also without whirls. They manifest themselves (4.81) uninterrupted as X-ray bright points, averagedly at 40 points of the Sun, including the poles (Ph).



fingers. In a distance of some centimeters, the rotation is allowed. The repulsed magnet turns immediately and the attraction brings it back. The repulsion is impossible over the distance of 2-3 times of the length of these or other "dipols" of e.g. solar loops, coronal loops, prominences.

The magnetic field as a "loaded spring" is not necessary. The CME has an electrostatic "rocket" ! The positive ions in the corona get more positive charge by the protons of a new emerged proton bubble. These protons fly into the corona and also onto the near surface areas which become stronger positive by these protons (sketch flare and prominence 4.95).

The charge of a flare caused the CME on the right side of the pictures taken from an Internet-film (4.82). The shown equatorial events are explicable: the first sunspot-group of the new, 23<sup>rd</sup> cycle appeared near the equator in 1996 Nov. (4.13). This suggests an equatorial, and therefore rare, first core-explosion in 1995 (3.18) which sent the first big proton bubbles to the equator, causing the first big CME of this new cycle.

Such equatorial ejection of a solar loop of only about 150 000 km was observable from my observatory two years later in 1997 Oct. 18 see photo 4.93.

The form of a straight line of the CME is electrically explicable as being a flux tube which was repulsed electrostatically. The positive corona was made more positive and ejected with high velocity by a flare. The moving electric charges are strong electric currents which attract each other (1.09). The strong repulsion from a large positive area caused a radially accelerated positive matter. The straight line is the result of the much stronger repulsion than the solar gravity. The electrodynamic attraction of the pillar of the CME onto the big loop is clearly observable in this very interesting film of SOHO.

This solar gravity normally forces, by attraction, the emerging flux tubes of a coronal loop to flow back onto the solar surface as the Earth attracts the ejected water of a geyser. In this event in 1996 (Jan.15), the electrostatic repulsion from a very large, positively charged area was much stronger than the strong solar gravity (4.82).

#### **PROBLEM:**

It is not clear why the CME on the left side erupted contemporarily. Perhaps the positive charge of the CME on the right attracts the electrons of the right solar side and repulses the protons onto the diametrical opposite side. The same "influence"-process often occurs in the case of charged terrestrial clouds. The attracted electrons were neutralised by the big amount of positive charge which surfaced on the right side of the Sun (4.82) and the positive charge erupts everywhere but maximally on the left (opposite) side, from where the electrons are attracted in all directions and in all possible solar surface-course to the right side. The lack of the electrons produced within about 10 hours small CMEs from all areas which were somewhat more positive at the begin of the CME on the right side.

The electrostatic repulsion is perhaps transported by the photons along the conducting solar depth of about 1 000 km in seconds or within one minute with almost light velocity. This layer can have a low hydrogen dissociation but it is

still transparent for the photons. The CME on the left therefore appears in the same hour as shown in the pictures (4.82).

This model seems to be proved by other exactly radially ejected smaller and weaker corona. These weaker CMEs escaped from the Sun, around the whole visible circumference, on this day. These, only about 20 ejecting areas (emerged proton bubbles), remained fixed during the whole day. These weak peaks were seen only on the computer but unfortunately not in its printed reproduction in 4.82. The electrostatic push overran the whole Sun, somewhat stronger on the northern hemisphere as is expected according to the shown rule: north-south-north-south and now in the 23<sup>rd</sup> cycle **northern dominance** again (chapter 3 dynamic Sun).

SOHO and Internet accelerate the scientific development enormously by showing not only fresh static pictures but also dynamic processes in movies.

#### ● How can transients run in the corona with 1000 km/s ?

The transients in the corona cannot be created thermally.

The heavy coronal ions have a relatively low thermal velocity because of their big mass. E.g. the iron ions have a thermal particle velocity (M) even at 6 MK of only 50 km/s. This means that the corona reacts, if a flare erupts, with a 20 times higher velocity than its particles can move. This is impossible. The highest coronal layers move outwards in 5 minutes if a flare appears below them. This observation excludes any thermal explanation.

Analogy: In an athletics championship, a relay cannot have a velocity of 1000 m in 2 minutes if all athletes can "run" with a velocity of only 50 m in 2 minutes.

The MHD-waves were created to explain these velocities. But they have many unexplained properties. They were described in detail mathematically in many papers but hardly in measurements. See above in the wind-chapter.

Also the model is missing to show why these MHD-waves should always cause a motion upwards and never a motion downwards. As sine-waves, they should act symmetrically.

**The electric astronomy** shows the high positive charge of a flare as an appearing and electrostatically exploding proton bubble. Its protons fly with relativistic velocity in a large sphere. The originally positive surface will become locally more positive and produces a stronger electrostatic repulsion. This can be observed also days later as strong X-ray light of this area. (Héderváry 1980). This sudden appearing of the positive charge on the surface runs upwards as an **electromagnetic wave** and pushes all coronal layers, which contain the positive solar "satellites"

(the corona ions) on elliptic orbits. The higher electrostatic repulsion pushes ions outwards. In this way all the layers move always outwards. Only an "electron flare" could cause a motion of the corona downwards, but an electron flare is impossible due to the thermoelement effect. The carriers of the positive charge are heavier than those of the negative charge. Thus, the exclusive upwards motion is clear (4.95).

The electric model explains also the Fe-XXIII ions: The flare-protons fly upwards and tear more electrons from the e.g. Fe XIV-ions. So the sudden appearing of the highly ionized iron atoms can be understood. No magnetic explanation is necessary or possible.

## STRUCTURE OF THE CORONA

### ● Why do HeI light in 1600, HeII in 1900, HeIII in 2000 km ?

Why is neutral helium (HeI) found in an altitude of 1600 km but the He II-ion at 1900 km and He III ion at 2000 km (4.15) ?

The electric astronomy shows the electric acceleration-process in the photosphere (4.16). Helium has a low mass, it can get in 5778 K an average thermal velocity which enables it to fly up to 1600 km and, after culmination, to fall back. At this highest point of its elliptic orbit, neutral helium spent the longest time there and shows a maximal density above the Sun. But if it is ionized by protons of a proton bubble in the vicinity, the electrostatic repulsion elevates this ion higher, into 1900 km.

Similar process acts in the case of the He III ions. The positive coronal area pushes this ion twice stronger than the He II ion.

### PROBLEM:

It is not clear, why He III flies only up to 2000 km. According to curve 4.15, this is the altitude, where all the weakly ionized atoms culminate. The strong density of this layer is observed probably due to the culmination of the two most abundant matters: hydrogen and helium, which reach only up to 2000 km. Naturally, the culmination of the protons would be already a clear explanation, but this is not contained in the curve. Also the strong positive charge of all low ionized atoms (e.g. Fe III, Ca III, Mg III) in this characteristic altitude of 2000 km (curve I. 15) brakes the He III electrostatically. It cannot fly higher.

Calculations can clarify this model. The highest density of ions above the solar surface seems to be at the altitude of 2 000 km. Also other observations suggest this braking and diffusing character of this layer which is seen as the border between chromosphere and corona. It has probably a strong positive charge.

In the solar wind, neutral helium (HeI) can reach escape velocities and leave the Sun for ever. The here measured maximally 1600 km over the photosphere of the same temperature, clearly shows that the same helium atom reaches a very different altitude in the wind related to that in the corona. The curve 4.15 strongly suggests this difference by showing a braking layer of many heavy ions near to 2000 km. This layer is still not clear. Probably the protons fly maximally onto this altitude and their big mass brakes other lower ionized ions. All atoms of highest abundance:

H, He, O, N, C

remain in low orbits in the chromosphere either as atoms or as low ionized atoms. But a positive electric charge above 4-6 as e.g. O VII can probably penetrate this dense layer (4.17). O VII culminates already at the altitude of 6 000 km (I. 15). These strong ions have the strong repulsion from the same positive active region which ejects weak ions as e.g. O III ions into the altitude of only 2 000 km (4.15). Moreover, strong ions have the possibility to evade (4.17) the weak ions (e.g. He III) in all altitudes of their orbit.

● **Why are the coronal ions ionized stronger in higher altitudes?**

**The non-electric astronomy** explains this ionization (4.15) with a high temperature and the high temperature by the transformation of the magnetic energy to heat-energy. Some “magnetohydrodynamic waves” or sound-waves (both of unknown origin) start below or in the photosphere and run up into the corona. As the “coronal plasma” becomes thinner, these waves become a shockfront and give their energy to the coronal layers. Parker suggested that the inobservable microflares or picoflares could heat the corona. But all these “heating methods” from below would heat the lower layer stronger and the upper layer weaker (Phillips 1992).

**The electric astronomy shows that** an accidental higher ionization by proton bubbles causes a higher electrostatic repulsion. The higher repulsion causes a higher elliptic orbit (4.15). No heating method is necessary at all, the corona is not hot but positive.

● **Why are Fe X, Mg X and Si X almost in the same altitude ?**

4.15 shows this astonishing fact. The magnetic or thermal corona- model has many contradictions:

- “why is the corona so hot ?” (Phillips 1992)
- why is the corona hotter outwards ? (“When you sit far away from a fire, for example, it warms you less.” Lang 1995). This 4.15 curve describes

successively hotter and hotter corona in higher and higher altitudes, but where is its limit ? This curve has its extrapolated end in **non-physical** infinite temperatures.

- A new contradiction is that these ions Fe X, Mg X and Si X are found in the same altitude. The ionisation-energy after the stripping of these 9 electrons is a specific value for each atom. These energies are very different for Fe, Mg and Si. These ions cannot form together a layer of 1.3 MK as shown in 4.15. The law of equipartition forbids the Mg X and Si X ions to exist with Fe X ions within the same layer of an altitude of 20 000km. In this layer of alleged 1.3 MK (4.15) only such particles can exist together which have the same energy according to the Boltzmann equation.

Therefore, instead of these Mg X and Si X ions, e.g. Mg IX and Si V III ions should exist together with Fe X with the **same electric energy** and not with the **same electric charge in this layer!**

The curves of 4.80 clearly show that the thermal zig-zag motion at 1.3 MK tears 9 electrons from the iron atom but only 6 electrons from the oxygen atom in which the strong attraction of the positive nucleus is only weakly screened by two remaining electrons. So the ionisation-work of the thermal pushes at this temperature of 1.3 MK is the same when tearing 9 electrons from the iron atom and when tearing 6 electrons from the oxygen atom.

Curves of 4.80 show that,

Fe X ions are formed by a temperature of 1.3 MK

O VII ions are formed by a temperature of 1.3 MK

but these ions do not form together a supposed 1.3 MK hot coronal layer in the altitude of 20 000 km. **They are definitely not found in the same layer.** The temperature cannot determine the coronal layers ! This coronal layer should not contain Si X and Mg X ions but it contains them. This layer should contain O VII ions, but it does not contain them.

The only explanation is that the corona is not 1.3 MK hot in this layer of 20 000 km.

The corona-curve of 4.15 shows the O VII ions in a much lower layer i.e. in the altitude of only 6 000 km in a layer of only "1 MK" !

The O VII ions exist together at this "temperature" of 1 MK with Si VII ions. The "high coronal temperature" does not determine the layers of the coronal ions as described in the original caption of 4.15.

A coronal layer comes into existence **by collecting the ions of the same electric charge:**

Fe X and Si X and Mg X in the altitude of 20 000 km  
 O VII and Si VII in the altitude of 6 000 km  
 O IV and Si IV and C IV in the altitude of 2 000 km

The ions of the same electric charge exist together in the same layer and not those of the same supposed high temperature. The thermal equilibrium of the ionisation and recombination at a certain very high temperature does not explain the observations in 4.15. The perpendicular axis is electric charge and not temperature.

The layers of the corona come into existence electrically and not thermally. It is physically impossible that particles of different temperatures (i.e. of different energies) as e.g.

Fe X and Si X and Mg X

exist in the same layer. The zig-zag-motion would equalize these different particle energies immediately.

**The electric astronomy** shows the ions as produced by the accelerating process of free protons during the cool down of a proton bubble below 13 000K. The heavy (e.g. Fe) atoms are either from the surroundings or are transported from the core-explosion. The orbit of these ions will be determined

- by the accidental electric charge of the produced ions
- by the solar gravity
- by the density of the positive electric charge of the emitting area causing an electrostatic repulsion
- by the local electric field from a positive to a negative area.

Ions of the same electric charge of e.g. O VII and Si VII are ejected into the layer of the altitude of 6 000 km while Fe X, Mg X and Si X ions are together ejected from the same positively charged surface into the layer of the altitude of 20 000 km (4.15).

Due to the fact that O X cannot exist because oxygen can lose maximally 8 electrons and not 9 electrons, oxygen should not exist together with Fe X, Si X and Si X ions in the altitude of 20 000 km at all according to this electric model. In fact, oxygen cannot be elevated electrically above 10 000 km according to the observations in 4.15. Well known is that oxygen nuclei (O IX) can have relativistic velocities:

- in cosmic rays which would be equivalent with temperatures above 1 000 MK.
- Oxygen was found by SOHO in the wind with a “temperature” of 100 MK.
- Oxygen is shown at 10 MK also in the curves of 4.80.

These three observations would predict that **oxygen should be found in all solar corona-layers in all supposed temperatures** as oxygen nucleus if each coronal layer were created by a defined mysterious high temperature. But where is oxygen in form of O IX in the Skylab-observations of I. 15 in the layers of e.g. 50 000 and also in 100 000 km ? Oxygen remains below 10 000 km which shows the true electric character of the corona and its main difference related to the solar wind.

Analogy:

The positive solar surface acts like a chromatograph. It sends the mixture of many different ions into space on elliptic orbits and produces the corona. The chromatograph sends the light particles (e.g. light chromosomes) far away but the positively charged solar surface sends the heavy particles (e.g. Fe XXIII ions) with the highest electric charge on the longest course. The corona is the resulting “chromatogram” in which the layers are ordered according to the electric charge of their particles. The lowest layer is formed by ions with one missing electron and the highest layer by ions of e.g. 22 missing electrons, independent of the mass and ionisation-energy of these particles.

The corona is not similar to a refinery as is often supposed. The temperature and the particle-energy play no role.

The very different masses of the ions above

$$m_{Mg} : m_{Fe} : m_{Si} = 24 : 56 : 28$$

show that the electric repulsion plays a more important role than the gravity.

All the ions above accidentally losing 9 electrons have the same electric repulsion, they have almost the same maximal altitude. The curve 4.15 can be calculated by this electric model of the corona. The two times heavier Fe X-ion has really a slightly lower orbit with a culmination of about 18 000 km compared to the Si X-ion with about 22 000 km.

The Si IV-ion has even 2.3-times the mass of the C IV-ions but both have their culmination at the altitude of 2000 km.

table 4.11 Ions as indicators of temperature ?

These ions can be produced either by the here shown high temperature or in a cold way e. g. by shooting of high velocity protons onto e. g. iron atoms.

14 000 K		Si II
20 000 K	H I alpha	C II
30 000 K		Si III
50 000 K		He II
60 000 K		Si IV
70 000 K	C III	O II
110 000 K		C IV
160 000 K		O IV
200 000 K		N V
320 000 K		O VI
500 000 K		Ne VII
900 000 K		Fe IX
1.1 MK		Fe X
1.3 MK		Fe XI
1.5 MK		Fe XIII
1.8 MK		Fe XIV
2.0 MK		Fe XV
2.5 MK		Ni XVII
6 MK	O VIII	Fe XVI
9 MK	O IX (90%)	Fe XIX
20 MK		Fe XXV
35 MK		Fe XXVI

There are strong contradictions among the available data due to the impossibility of any terrestrial measurement above a temperature-equilibrium at 2800 K which could be realised in a tungsten furnace also in my industrial practice. Up to 2.5 MK, the source of the table above is: Phillips' table p 120. This contradicted strongly the curves 4.80 ( 6-9 MK). 20-35 MK were mentioned by Phillips on page 201-202. O IX is the oxygen nucleus which is present up to about 90 % at 9 MK (10% of oxygen exist at 9 MK as O VII).

Non-electric astronomy supposes that Universe is neutral, therefore no quick clouds of protons or any other electrically charged body is possible. So, it remains only the thermal way i.e. strong zig-zag-motion in a neutral plasma of e.g. 1.8 MK in which the e.g. iron atoms collide and tear at each collision averagedly 13 electrons from the atom. When one electron recombines, this Fe XIV ion gives a characteristic spectrum, also the coronal green light of 530.3 nm. The temperature would be therefore easily measurable with the aid of this table, but many questions

have no answer since 1941: what is the cause of these very high temperature ? And why are the ions missing in the spectrum of an e.g. coronal loop which should reveal the recombination of 2, 3, 7 or 13 electrons onto the Fe XIV ions ? If the "hot plasma" is natural, 13 free electrons must co-exist with each Fe XIV ion ! The spectra of lower ions e.g.

Fe XII      Fe X      even      Fe VI

should be found in the coronal spectra in the altitude of 20 000 km ! But only the spectrum of Fe XIV is present. This observation proves that only very few electrons are available – perhaps only one electron for 100 ions and not 13 electrons for one Fe XIV ion.

The ions of the same electric charge<sup>+</sup> (e.g. Fe X, Si X and Mg X according to 4.15) were found in the same coronal layer by Skylab but absolutely not the ions of the same temperature (e.g. Fe X and O VIII) as magnetically explained. Also Phillips looked for a solution (p 201):

“ Plasmas with such different temperatures can only co-exist if they are in separate magnetic flux tubes...”

But how could a totally transparent magnetic wall insulate between large layers of

O VII (shown in 4.15) of a temperature of 1 MK (4.80) and  
Ne VII of a temperature of colder than 500 000 K (table 4.11)?

This huge temperature difference of 1MK - 0.5 MK = 0.5 MK would produce two layers in the altitude of about 6 000 km (4.15) in microseconds of an equal temperature of e.g. 680 000 K. In this resulted temperature, both ions cannot exist.

The same problem exists for all coronal layers.

Therefore **only the electric explanation of table 4.11 remains:** the ions do not show the temperature of the layer but its positive electric charge and an almost perfect absence of free electrons. Only those electrons are present which just recombine the ions e.g. an Fe XIV ion to an Fe XIII ion.

**The ions do not show the actual temperature of a layer or a loop but the result of the quick protons in the proton bubble**  
**minutes (in the case of a flare),**  
**hours (in the case of a coronal loop or a postflare loop)**  
**weeks (in the case of a prominence)**  
**before the observation.**

● **Why does the corona sometimes show a sudden higher X-ray-light?**

A Yohkoh film shows this effect beautifully in X-ray showing the rotation of the Sun. Already the film composed from the many UV and X-ray photos of the

Skylab have shown also such "lightnings". Phillips mentions that the prominence suddenly lights stronger in X-ray on the side facing the flare.

**The electric astronomy shows the flares**, which shoot their protons in all directions, also into the arches of the corona or prominences (4.95). These loops are hit by the quick protons from the "proton-explosion" of the flare. This makes the hit sides more positive. The additionally ionized ions naturally stronger attract the electrons from the e.g. solar wind or from the not hit portions of the corona or prominence. During the recombination by these quick electrons, the hit surface radiate strong UV-, EUV- or X-ray-photons. Clearly, these photons appear only for a short time, as a sign of a new electrostatic constellation i.e. of new "anodes". After all available electrons are attracted, the strong ions remain "hungry" for more electrons, but they do not get any.

#### ● Why is the corona very high during the sunspot-maximum ?

**The non-electric astronomy consequently shows** the stronger magnetic fields which have more magnetic energy to heat more corona. But the known problems of the corona-heating and the corona-temperature-distribution (4.15) are unsolved (see above).

**The electric astronomy shows the strong positive electric charges**, which arrive at the surface (together with the whirls) from the positive core after 4 years of elevation. Fragments of core-explosions in 1995 surface in 1999.

The most positive matter i.e. the flares transport free protons of high concentrations which explode. So a stronger ionisation comes into existence. More ions were emitted by larger positive areas which are stronger charged.

#### ● Why does the corona often contains loops ?

**The non-electric astronomy gives the answer**, which seems to describe the reality: the corona is heated by the magnetic field of the empty flux tubes. These empty flux tubes - which were prepared by the dynamo during the minimum - somehow appear above the surface and are somehow filled by hot plasma.

The only value of this model is that the form of the coronal loops is similar to selected force-lines of secretly produced magnetic fields (4.10).

But there are many problems with the "magnetic corona" as shown above. Lang (1995 quoted in introduction) emphasized the missing transformation of the magnetic field to the high concentrated energy-density of the coronal ions. In addition, this is forbidden by the entropy law (see calculation in 1.6). Even if a such a transformation existed, not the ions of the same energy, but of the same electric charge exist together in a certain layer of the corona. Measurements in 4.15 perfectly exclude a thermal explanation.

**The electric astronomy** shows the flux tubes which grow from the emerged proton bubbles (1.09, 3.21, 4.81). Only the concentrated positive charge causes a loop.

● **How can a coronal loop remain together if it is charged ?**

According to the **electromagnetic model**, the electric repulsion of the positive electric charge in a coronal loop does not overbalance the *electrodynamical force* (1.09). Normally, no electrostatic explosion occurs. Only an additional positive charge from a flare produces such an explosion. The exploded coronal masses fly upwards in a coronal mass ejection (4.82).

● **Why is the density of the corona constant?**

Measurements show this surprising fact. The density is  $10^{-17}$  kg/m<sup>3</sup> from the surface up to over 2 solar radii. No explanation is given. The "logarithmic formula of the barometer" is not valid for the corona.

**The non-electric astronomy shows the corona** as being made by closed magnetic fields. The problems are:

- The density of the corona should be less than 12% of the highest-density in 2 000 km due to the lower and lower strength of the magnetic field there.
- In addition, the number of particles should decrease exponentially due to the solar gravity.
- Furthermore, the corona should have a higher temperature at higher levels (4.15). This would cause alone a lower density in these higher levels.
- And still more, the solar wind should be the evaporation of the corona. This effect should clearly lower the matter of the corona by 1 million tons in each second. The loss of matter is naturally stronger at higher "temperatures", therefore at higher altitudes (4.15). Due to this factor alone, the density of the outermost layers of the corona should be gradually lowered.

But the density of the corona remains almost constant. It does not decrease along the solar radius, as one could assume, according to the addition of the 4 functions above.

**The electric astronomy explains this measurement.**

- The constant density of the corona shows clearly again that the corona is not a hot gas. The gas-law is not valid. The electrostatic repulsion defines another distribution of the coronal density in comparison to the pure solar gravity.
- The negative solar wind cannot lower the density of the positive corona in higher altitudes. It does not start from the corona at all. It starts from the

negative coronal holes around the poles and not from the coronal “hottest” top-layers as Parker thought (1954).

● The constant emission of new and newer coronal ions from the positive areas increases the volume of the corona and lowers the possibility of the recombination of the coronal ions in low layers. They get the necessary electrons for their recombination, only from “above”: from the wind (4.58). For example, an Fe ion is repulsed by the positive Sun but attracted by the mass of the Sun. But after recombination, an iron atom is not repulsed anymore but still attracted. It falls down.

**The corona is pressed from below into the wind where the coronal ions recombine and fall back undetectable, as neutral atoms. Therefore, the coronal density remains almost constant throughout.**

The flux tubes in 1.10 impressively show this sudden “cut”. Their ions recombine in the wind suddenly similar to candles immersed into hot water.

Analogy:

With a speed of 100 km/h, the normal density of the autos on a bridge remains more or less constant because e.g. while 56 autos roll on it, 56 autos roll away from it in one minute.

## **MATTER OF THE CORONA**

The heavy matter of the corona as iron, nickel is a strong contradiction in all known corona-models. Which is the natural force which elevates these matters above high altitudes of 20 000 km but leave behind the light solar matters as hydrogen, helium and neon ? ... Heat ? MHD-waves ? Shock-waves ? Perhaps “magnetic explosions of microflares and picoflares” ? All these factors would easier elevate the light matters but not the heavy ones.

**The instinctive supposition of a “Neutral Sun”**

- as a self-evidence, which does not need any further consideration - inhibited all possible explanations of the corona since 1941.

The electric corona-model shows the possible high positive charge of the coronal ions (e.g. Fe XXIII). Only this charge explains the corona. The heavier matters are more often elevated because, and if, they have a higher positive charge and not because they are heavier. Iron can lose 26 electrons but hydrogen only one and helium only two. The electrostatic repulsion elevates e.g. one Fe XIV ion 13 times stronger than a proton. The corona, with all its properties (e.g. 4.15), becomes at once clear.

● **Why does the iron-ion play an important role in the corona?**

**The non-electric astronomy** has no answer since decades. Iron and calcium gives the solar eclipse (4.56) its characteristic almost white light:

green by Fe XIV at 530.3 nm

red by Fe X at 637.4 nm

yellow by Ca V at 569.4 nm.

**The electric astronomy** shows the ionization during the acceleration of free protons in the photosphere (4.16). This process produces naturally also gold and thorium ions of higher velocity than Fe-ions, but these cannot be so easily detected as Fe, which has a very high abundance in the Universe: 64 ppm (atom-parts per million).

This is the 7<sup>th</sup> strongest abundance after H,He,Ne,O,N,C :

**Table 4.12**

**Atom-parts per millions of the Universe:**

H	839 000 ppm	1 electrons
He	159 000	2
O	680	8
Ne	640	10
N	200	7
C	130	6
Fe	64	26
Mg	42	12
Si	35	14
S	12	16
Ni	5	28
Al	3	13
Na	3	11
Ca	2	20

Therefore the iron-ions have a high density and can lose 26 electrons, which means a strong positive electric charge and therefore a strong electrostatic repulsion. As curve (4.15) shows, the Fe-ions have the highest orbits among the common ions. Fe XXIII ions with only 3 rest-electrons come into existence when strong flares shoot their protons into the corona (Stix 1991 p 329)

In addition, iron is the end-product of fusion. The supposed thermonuclear runaways (Ky 1996, Grandpierre 1996) are probably often stopped by this end-product. The proton-bubbles transport this iron to the surface.

● **Why do relatively few neon ions appear in the corona ?**

**The non-electric astronomy** recognised the so-called FIP-events. First Ionisation Potential is correctly seen as important parameter in the structure of the corona. E.g. neon has a high FIP and a low abundance in the corona.

Not only the FIP is interesting but the whole ionisation potential of the atom.

The electric astronomy shows an interesting proof by this experience. The neon ions should be found in the corona according to table above :

$$640\text{ppm} : 64\text{ppm} = 10 \text{ times more}$$

than iron-ions. In addition, the neon atom has 2.5 times lower mass than iron. But neon ions are poorly seen there (curve 4.15).

The cause is the high ionization-voltages of neon. This noble-gas attracts strongly its 10 electrons. The proton-collisions cannot tear them as easily as at iron. (Iron is used in the terrestrial spectroscopy as standard-light for the finding of atoms in an unknown matter.) But poorly ionized neon will be poorly repulsed by the positive surface of the corona. Neon has a 10 times higher abundance but it mostly remains in the surface **in form of atoms** and iron of lower abundance will be ejected **in form of ions** 200 times (Lang 1997) more in the corona than neon. Neon has the fourth highest solar abundance after H, He and O. Each thermal- microflare or shock-wave-model would at least eject due to the relations in abundance and mass:

$$10 \times 2.5 = 25 \text{ times more neon}$$

than iron, but the positive surface ejects 200 times more iron. The factor

$$25 \times 200 = 5\,000$$

is between the prediction of the wrong model and the measurement.

● **Why can helium be found on low altitudes in the corona ?**

**Stix and CA show helium on this altitude, but they do not deal with it.**

**The electric astronomy shows the two electrons of the helium as stably bound.**

The noble-gas helium has higher ionization-voltages than neon. But helium can be found in the corona because of its very high abundance of about 250-times related to that of neon (table 4.11).

Helium has a low altitude of about 1600 km as He II-ion (curve 4.15) because it can lose maximally two electrons and this low positive voltage produces a low

electrostatic repulsion pushed by the same positive surface area which pushes e.g. Fe X-ion in the altitude of 18 000 km.

**PROBLEM:**

It is still not clear, what are the forces which determine the altitude of the coronal ions. Mainly the electric charge and also the gravity are surely important. But proton has the lowest weight related to its charge.

● **Why do Fe XXIII ions appear in the corona after a flare ?**

(Stix 1991 p.329.).

**No magnetic explanation exists.**

**Electromagnetic explanation:** The quick protons of the flare fly into the corona and collide with its already ionized atoms (4.95). They can sweep along a part of the rest-electrons. So the ion Fe XV is transformed to Fe XVIII or even to Fe XXIII. Very probable, the high, relativistic velocity of these protons is sufficient to tear off an electron also without a direct collision with an Fe XIV ion, only inductively.

The positive charge density of large portions of the corona will be radically and quickly increased. Phillips mentions that sometimes the flare has a long distance to the coronal mass ejection.

● **Why does the corona sometimes have too much light helium ?**

Phillips described this observation in 1992 without giving any explanation.

**The electric astronomy shows** the proton bubbles in which matter elevates from the core and from the core-explosion. These bubbles from the depth can sometimes contain 10 000 times more light helium than the photosphere due to the fusion-chain from hydrogen to normal helium. Light helium is fused from deuterium and it is the basic matter for normal helium. It is the inbetween stage in the process of fusion in the core, as well as, in the core-explosion. Theoretically, a light helium layer covers the core. It contains more than 100 times  $^3\text{He}$  than  $^4\text{He}$ . The electrostatic emission of light helium ions also needs less energy than the normal helium. The electric charges are the same: He II or He III.

● **Why does Capella have a stronger corona than the Sun ?**

Capella consists of two yellow giants of masses 2.2 and 2.8 solar masses but the same surface temperature as the Sun. The corona of it shows Fe XIII- up to Fe XXIV-ions but few weak ions such as Fe XIV ions which are characteristic ions of the solar corona. (Bowyer 1994 S & W).

**The non-electric astronomy describes** these iron atoms as being ionized by a **coronal temperature of 6 MK**. Also the thermonuclear reactions - closed into some magnetic cage - were supposed among the explanations. There is no idea about the missing "solar" ions.

The necessary density of matter is very high for a fusion. If this very dense matter had a **real temperature of 6 MK** it would give a stronger visible light through the magnetic cage than Capella, or even the Galaxy itself (see above). The Earth would be vaporised by this heat-emission of Capella. This impossible model can still give no explanation for the production of only Fe XXIV ions and not of Fe XIV ions. The stronger ions should be produced by the core of this supposed "magnetic cage" and the weaker ones in the colder surface. But in this case, the Fe XIV ions would emit a stronger X-ray light into the free space. Whereas, the Fe XXIV ions, screened by the weaker ions, would emit a weaker light. However, observations show the reverse.

**The electric astronomy explains** these higher ionized iron atoms.

The strong Fe XXIV-ions are consequently the results of the stronger thermoelement-effect in both Capella-stars. Both have a surface temperature of 6 000 K. The diameter of 16 solar diameters shows a very high core-temperature. This high temperature-difference and low density (due to only 2.2-2.8 solar masses) produces a strong thermoelement-effect which amplifies the the production of the solar wind and the cumulation of the positive charge in both stars of Capella.

But a stronger density of protons in the proton bubbles and positive surface areas causes stronger ionized atoms in Capella up to Fe XXIV.

The lower ions such as **Fe XIV are not missing** in the corona of Capella, they just do not light. The high positive voltage of the surface presses all ions into the wind, but only those can light which get electrons. Naturally, the strongest ions as Fe XXIV have always the highest position due to their highest repulsion and **only they get electrons from the wind**. The lower ions as Fe XIV play the role of the filling mass in the corona of Cappella and they are not in the highest layers as the Fe XIV ions in the Sun (4.15). Also in the vicinity of the "very hungry" Fe XXIV ions, the Fe XIV ions cannot light. These "solar coronium ions" cannot attract those electrons which were recombined earlier by the much stronger positively charged Fe XXIV ions.

Similarly, solar loops have often missing sections in hydrogen alpha light due to electron-arm volumina, but they do not have these missing sections in the light of coronal ions as Fe XIV (4.97).