

Report of the satellite symposium of the

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# FILAMENTS OF THE UNIVERSE

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## 1 Theses

1 The future form of the Universe in its largest-scale will be more and more the filament-form.

2 All filaments of the Universe are made electrically, via motion of electrically charged matter.

3 All filaments of the Universe have a circular cross section.

## 2 Introduction

The future of the Universe can only be predicted on the base of its explained present structures (see reports of e.g. F. Frey, E. Guendelman, and A.A. Starobinsky in this symposium). However, three most important structures were discovered in the last years and are still not understood:

1. The largest structures are not the superclusters but the filaments. One of the longest one is in the Aquarius, consisting of 23 superclusters. This filament is longer than 1 Gigalightyear. But already about 10 % of the galaxies form filaments with obvious circular cross sections. The length of each is about 100 Megalightyears (Fig.1).

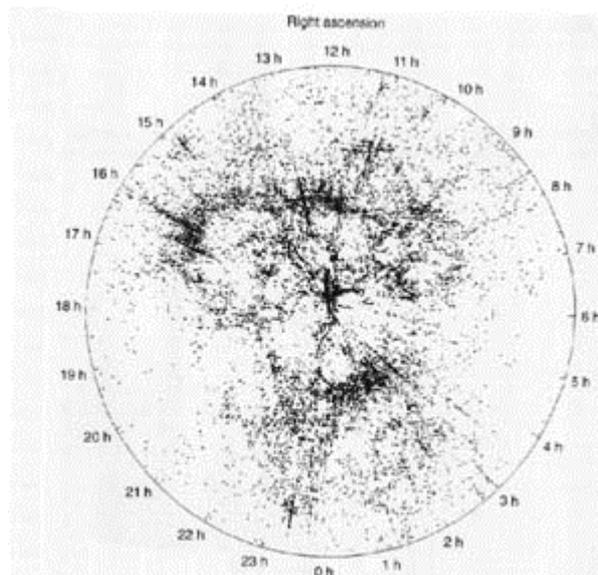


Fig.1 Filament-structure of the nearest 16 000 galaxies. (M.Geller and J: Huchra 1992)

2. The expansion of the Universe is not braked but accelerated.

3. We now have a corona problem not only in the case of the solar corona, but another corona-problem of much higher dimensions and intensity. X ray astronomy shows huge clouds of a temperature of allegedly 30-300 MK These are the so called „hot” halo- or cluster-gases. These clouds have a higher mass than that of the stars in them. No thermonuclear fusion can cause or conserve this temperature. This

clouds should be cold in picoseconds via heat radiation into the empty space. But no heat radiation can be measured.

Ideas for the solution of only one problem are not acceptable. For example, the „negative pressure” of the space - which should somehow suck the visible superclusters apart - or the „vacuum-energy” or „dark-energy” - which should somehow accelerate these clusters - cannot explain the observed filament form (Fig. 1).

All three problems above can be solved with the discovery of the thermoelement-effect of the stars which shows a new model: the Electric Universe (L. Körtvélyessy 1998).

### 3 Nature of the filaments

Let us first analyse some terrestrial filaments.

The electron beam in the TV is a filament of electrons. The three electron guns have a hole of a diameter of 2 mm each. But the electron beam would produce a very blurred white-black picture on the screen with a spot of this diameter (all the three phosphors of the screen would light contemporarily given white light together). Moreover, the projection onto the fare screen would enlarge this spot about 20 times. But in reality, this spot has a diameter of only 0.2 mm due to the attraction among the negative currents in this electron beam. This attraction is much stronger than the very strong electrostatic repulsion among the electrons in the beam. The electrons - injected into the big volume of the screen-valve - do not explode electrostatically and do not fill the whole big volume, but form a thin beam which has a smaller diameter (0.2 mm) than the emitting surface (2 mm). The negative currents in the beam look for the minimal cross section. This is the circular cross section.

Similarly, the lightning is also a filament of a circular cross section of a diameter of about 0.1m. Also the lightning has a much smaller diameter than the charged cloud which emits it. The strong electrostatic repulsion among the huge number of electrons is overbalanced by the much stronger attraction among the electric currents. Only the movement of electric charges produces the filament, if the lightning would stop, it would have immediately a very big and exploding volume of a diameter of many kilometres due to the electrostatic repulsion.

Each spark - of the e.g. test-plant for electric insulators - is an electric filament of a circular cross section. Stronger currents cause thinner sparks due to the stronger attraction among the negative electric charges in motion. An ion-beam in CERN is a positive filament. The ions do not explode electrostatically, they remain in a narrow beam of a circular cross section. This ion-beam has no recombination-light because no electrons are available. Extraterrestrial filaments.

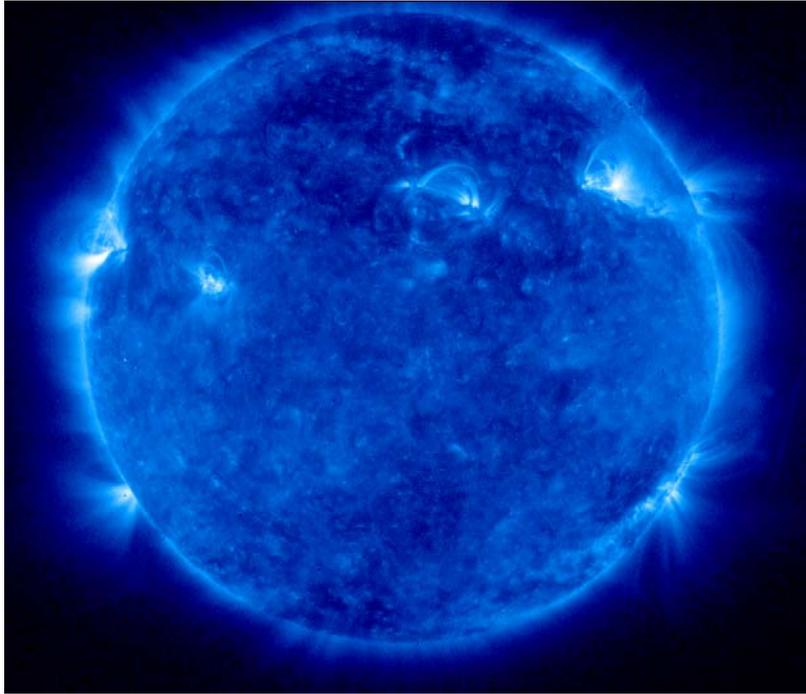


**Fig. 2 Solar post flare loops in red are emitted by round active areas which are shown in white**

Fig. 2 shows post flare loops of the Sun from a movie taken in the light of hydrogen alpha. ( A very detailed explanation was shown by Körtvélyessy 1999 April). The active areas are white due to their strong recombination-light. Note that these active areas are round, nearly circular - not long filaments of a dynamo. They emit the loops of much smaller diameter and weaker intensity in the perpendicular direction to the surface. These observations are inconsistent with the supposition of a solar dynamo which should somehow produce magnetic tubes which surface and appear as active areas or filaments. The filaments seem to have a circular cross section otherwise their observable diameter would change.

The whole movie from which this picture is taken shows the motion of matter in the loops, the hydrogen alpha light shows a recombination of protons, therefore, these filaments are produced by positively charged matter in motion. The positively charged and therefore active masses emit themselves. Immediately after the start, the filaments are formed via attraction among positive currents and their diameter become smaller than that of the active area. Their cross section is circular. The surfaced positive matter emits itself simply by electrostatic repulsion. The positive matter has its origin in the solar core; see below at the origin of the positive matter.

Fig. 3 shows the Sun in the light of iron ions. Active areas of larger diameter - in white color - emit fine filaments of much smaller diameter. Also the diameters of the beautiful loops are almost the same. These diameters have almost the same value along the loop (Klimchuk 1997,1999).



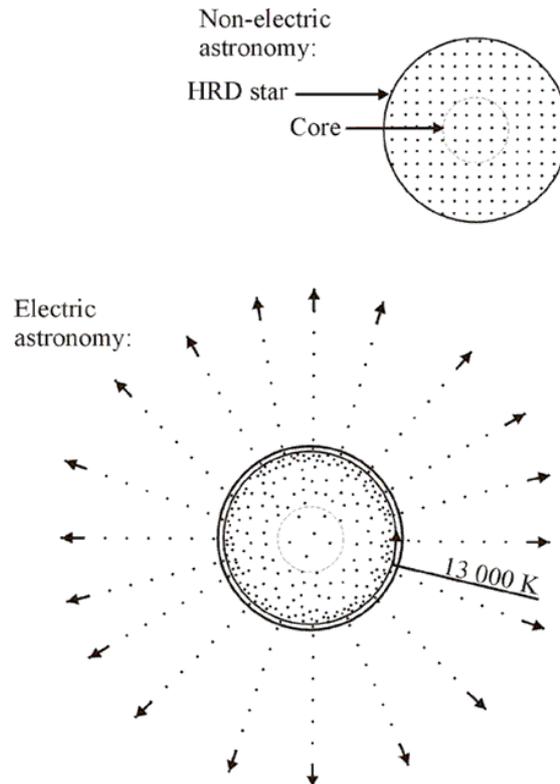
**Fig. 3 Many filaments of the Sun shown by EIT of SOHO. Round active areas (white) emit thin filaments (blue) which become thicker when the velocity of this emission is braked by gravity. Lower velocity of the same positively charged matter means lower electric current, therefore, lower attraction among the parallel currents and, therefore, higher diameter.**

Note that the footpoints of these loops are in northern-southern direction which cannot be explained by a hypothetic solar dynamo. This mysterious dynamo is allegedly driven by the differential rotation which, as well known, has an eastern-western direction.

The filaments of superclusters were shown in Fig. 1 . No active areas emit these filaments, but their form is made also via motion of electric charges as will be shown below.

## 4 What is the cause of the accelerated expansion of the Universe ?

The answer was already looked for by more authors of this symposium, shown in the reference. In this paper, a model will be suggested which seems to explain not only the accelerated motion, but also the filament-form of the superclusters and the strong X ray emission from the cluster-gas. The common answer is: all these three recent observations are consistent with the production of the electric charge in the HRD-stars (Fig. 4 below).



**Fig. 4 Separation of the positive and negative electric charges by temperature difference (by thermoelement-effect). Non-electric astronomy supposes that stars contain everywhere exactly 50-50% of electric charges (above). Electric astronomy takes into account that the electrons (black dots) have at least 1836 times smaller mass than the positive particles, therefore, they explode in the transparent hydrogen layer (below 13 000K). This continual electric explosion is the solar wind.**

Cosmology was relatively easy to understand before 1998 February when the recent measurements of the Ia supernovae were not known (Perlmutter 1998). One galaxy from the 16 000 ones - shown in Fig. 1 - attracted the other galaxies and therefore the velocities of all galaxies were continually lower. Most likely, these velocities will be reduced to zero by the uninterruptedly acting gravity and, then, all galaxies will start the Big Crunch. We had a simple Universe - a forever-oscillating one - in our mind.

Nobody looked for a „vacuum energy" or for a „dark energy" which would reduce the expansion-velocity ! Just a force, the gravity, was enough.

It was not mentioned due its evidence, but this gravity-model had an important advantage: the braking-force of a certain galaxy had its anti-force based in the other galaxies ! But now, the new ad-hoc-models do not seem to obey the third Newton-law. Even, if a vacuum-energy existed and could be transformed to an accelerating force, the vacuum cannot be used as source of an anti-force. It has no mass. No acceleration-force of a galaxy ( mysterious or clear) is possible without a clear anti-force.

If the galaxies would be charged e.g. positively and the caused electric repulsion force would be e.g. 10% stronger than the gravity, the accelerated expansion caused by the electric repulsion would remain forever due to the fact that the electric force has an infinite range and the same formula related to that of gravity. This model would obey the third Newton-law because the electric force would push one galaxy in one direction and all other galaxies in the opposite direction. We will see that the „hot“ halos of the galaxies and clusters are charged positively, however, not the stars of the galaxies.

But, is it possible that the accelerated expansion of the Universe is a simple result of the accelerated expansion of space ?

Naturally, physicists were often unsure about the nature and expansion of space. Also Einstein was unsure. But this idea of the accelerated expansion of the Universe by accelerated expansion of space did not emerge before 1998 February, therefore it seems to be an ad hoc idea. Moreover, this idea only prolongs the answer, because the next question will be: Why does space expand faster and faster?

Even if it would be so, the Universe contains many accelerated expansions in which a force overbalances gravity. Prominences, jets, planetary nebulae, lobes of radiogalaxies expand in very different scales which cannot be valid for the accelerated expansion of the Universe. These expansions of much smaller and various scale cannot be explained by the accelerated expansion of space !

Moreover, the same e.g. solar mass ejections have very different velocities:

15 km/s in 1996 Febr. 11 and 1 000 km/s in 1996 Jan. 15.

No cause in the supposed expansion of space seems to explain both motions ejected by the same body.

On the other side, the electric force can explain all these antigravitational motions, which is  $10^{36}$  times stronger than gravity.

## 5 What is the origin of separated electric charges in the Universe ?

One origin is well known: all bodies in the Universe are hit by strong photons and particles of the cosmic rays. Especially the clouds from which stars are born have a high surface which is hit by strong ultraviolet photons of young stars in the proximity. Most of the ejected electrons return to the cloud, but a small fraction of electrons leave the cloud forever due to the electrostatic escape velocity. H II clouds in quick expansion come into existence. Neutral clouds i.e. H I -clouds will be ionised to H II clouds. Also protons are ejected by the same particles, but their mass is 1836 times higher than that of the electrons, therefore their ejection is negligible. Therefore, negative clouds i.e. „H 0“-clouds do not exist. Nature has an asymmetry in this case. Stable positive ions exist but stable negative ions do not exist.

Another process of the separation of the electric charges is stronger but less known: the emission of the stellar wind (Birkeland 1896, Biermann 1950s, Körtvélyessy 1998). The stellar wind is known as a continually ejected and charged mass.

But what is the cause of this ejection and the charge ?  
Is this charge positive or negative ?

This question seems to have its very first answer in Fig.5. The big temperature difference between the stellar core and the surface moves the electrons and other light particles outwards. The electrons have a 43 times higher velocity in a given temperature related to that of the protons of the same temperature, therefore, the core will be positively and the surface negatively charged. The electrostatic repulsion in the core does not produce an explosion due to the non-transparent plasma in the core. Otherwise, already 0.001 g protons in overbalance - which means only 100 Coulomb more solar positive charge than negative charge ! - could inhibit the formation of the Sun. Also the electrons in overbalance in the stellar body are ineffective as long as they wander in the plasma. But arriving the transparent hydrogen layer - which has a temperature below about 13 000 K in the Sun - the electrostatic repulsion among the electrons produces a continual explosion which emits light matter into space. The cause of this process is constant: the temperature difference, which is 15 MK in the Sun. Therefore, the solar wind is constant in velocity (750 km/s see Ulysses). This wind is isotrop: 10 A from each square kilometre on the Sun's surface. The negative solar wind does not attract electrons, therefore the wind-emitting solar surface - the so called coronal hole - seems to be black in X ray. Small coronal holes emit wind of the same velocity of 750 km/s as the large coronal holes. According to this model, all HRD-stars separate the positive charged particles - which are cumulated in the core - from the electrons - which are emitted as stellar wind. Supposed core-explosions (Amabartsumian 1957, Grandpierre 1996) transport fragments of the positive core onto the surface.

The positive charge emerging from the depth to the solar surface is easy to distinguish from that of the wind. It is not constant, not isotrop and it attracts electrons, therefore it has a recombination light i.e. hydrogen alpha-, UV-, EUV-, X ray-light - but no infrared ! Due to the high concentrations, the emitted positively

charged matter forms solar loops (Fig. 3 Körtvélyessy 1999) or radial filaments ( Fig. 6). The loops and other emissions of the corona are, therefore, not 1-2 MK hot but positively charged.

The so-called „corona problem" can be solved by the recognition of the electric charges in the Universe and not monthly by new and newer models on the basis of a neutral Universe (e.g. picoflares, cold- flares, magnetic carpets; see NASA press releases in 1999). But there is a new and much greater corona problem: the halo of the galaxies and clusters is filled with allegedly 30-300 MK hot gas. But this not a hot gas- which would be cold in picoseconds by heat-radiation into the empty space - but it is a positively charged gas which produces the accelerated expansion of the Universe. It is the „cemetery" of the stars. It has now an atomised mass which is four times higher than that of the living stars. This will be shown below in detail.

The cumulated positive charge in the stellar core appears immediately when the stellar body is ejected:

I The white dwarfs are X ray active, strong magnetic stars which show their positive charge as anodes and as quick rotated positive charge producing up to 1000 Tesla.

II The neutrons stars show similar properties but amplified :  $10^{25}$  Volt and 60 GT.

## 6 What can be the model of the clustergases

Many interesting measurements show that the clustergases have strong X ray emission and a big mass. The first explanation of a mysterious very high temperature of 30-300 MK of unknown origin will be corrected below. The development of the

### 6.1 Last explosion of a smaller star: the GRB

When the degenerated core of a white dwarf explodes electrically due to the cool-down to a temperature below recombination-temperature (of e.g. 10 000 K), their cumulated positive charge is emitted into space as a gamma ray burst. Their positive particles in overbalance in the depth of degenerated electrons repulse and accelerate suddenly all other not-recombined positive particles. Therefore, a gamma ray burst is a cold explosion.

**Important: a GRB is an enlarged version of the solar flares.**

This electric explosion is the only model which explains the existence of a pure gamma ray production and the pulses (Körtvélyessy 1998). The light of this electric explosion (GRB) appears clearly later, when - and if - the cold fragments of the white dwarf collide with the nebula around the dwarf. The rejected glowing nebula gets relativistic velocity due to the measured and understood 99.99% light velocity of the cold electric explosion (which is NO fireball !). We see only or mostly the inside of this glowing shell, therefore only the redshift. (This redshift exists also in the solar flares !) The glowing shell between the GRB and us is almost invisible from our direction -

from outside - therefore the blueshift is yet not discovered. This blueshift, however, could be measured by Chandra because the X ray production lasts longer due to the hit e.g. Fe atoms, which recombine in the positive surrounding only very slowly (see solar flares). The X ray could be seen through the cold outer layers of the shell. The redshift must be the same as already measured in visible light, but the same blueshift must be measured by Chandra's spectrometer. If this model is correct, Chandra should find small and X ray active shells similar to the supernova remnants. The diameter-growing of these shells will show that a GRB is NO small Big Bang in cosmological distances but an event in our proximity, weaker than a supernova. These explosions of the white dwarfs in our proximity, in our Galaxy, explain the fact that very weak GRB was not found: the smaller stars are still hydrogen-burning ones. The existing white dwarfs have a low limit. (It is still not clear, why the longest distance of the detection is equal to the thickness of the Galaxy.)

Many dying white dwarfs pour a big amount of positive matter into space.

## **6.2 Development of bigger stars: supernovae, neutron stars, young stars, radiogalaxies fill the halo with positive matter.**

A supernova can explode only due to the positive charge in its core. ( Non-electric astronomy cannot understand that the implosion turns into an explosion and not into a black hole.) Their remnant strongly emits X ray after thousands of years as an anode. The remnant is characterized by many filaments due to its electric charge. The expanding positive charge emits radiowaves as an antenna.

A neutron star with its monoprotone surface (Körtvélyessy 1998) emits proton bubbles from its neutron body (similar to the young star its jets) which are accelerated electrostatically as soft gamma ray repeaters. Moreover: falling neutral matter is torn apart by its strong electric field and the atomic cores are repulsed electrostatically along lightyears up to relativistic velocities. These are the cosmic ray particles. Also the jets of young stars and radiogalaxies emit positive matter.

Table 1: Last explosion pour huge positive charge into the halo

Name of explosion:	Supernova	Gamma ray burst
Exploding body:	Big Star	White Dwarf
Mass:	$M > 7$ solar masses	$1 < M < 7$
Cause of explosion:	Yukawa-heat of the neutron star	Positive charged body cools down
Temperature of expl:	1 GK	10 000 K
Typical matter:	Fe	Co He
main energy export:	Neutrinos	Gamma rays
Remnant own temperature:	3 K (not 2 MK !)	3 K
Radiation of the remnant:	X ray (recombination) UV (recombination) Visible (recombin.) No infrared Strong radiowaves	X ray (recombin.) ? No visible later No infrared Strong radiowaves
Form of remnant:	Round cloud , later hundred filaments Twenty bubbles	Round cloud, later 10-20 filaments No bubbles
Last detectable diameter of remnant:	300 lightyears	0.5 lightyears
First magnetic field:	Maximally: 60 GT	Maximally: 10 T

Positive halos are the cold cemetery of the dead stars. They form the Universe. They do not emit heat due to their alleged 300 MK ! Most of these positive ions are neutralized to atoms in thousands of years by the light negative stellar winds, but these winds also fill the big empty bubbles where they do not meet any matter and the heavy ions remain concentrated in the halo more or less bound to the stars of the clusters by gravity. New measurements show that the mass of the alleged hot gas in the halo has a four times higher mass than the stars there. Therefore, the stars have the less mass and follow the positive clustergas along its way.

Now we can understand the three big puzzles of cosmology:

**1.** The positive clustergases are the cemetery of the exploding stars which were larger than our Sun. They emit X ray as anodes. This radiation is a cold recombination of e.g. Fe XXV ions and no thermal radiation which would destroy all stars and planets in them.

**2.** The positive clustergases sweep away the gravitationally embedded galaxies with their bigger mass. Due to their own motion related to the Big Bang, the moving positive charges of every galaxy, of every cluster or supercluster produces electric currents which attract each other. Therefore the filaments of the superclusters come into existence more and more (Fig. 1). The elapsed time since the Big Bang and the

slow production of the positive charge in the stars increase this development. No such filaments were present in the first Gigayear when the expansion was decelerated by gravity. At that time, gravity was the only force of infinite radius in function.

**3.** At present, also the second, the stronger (the electric-) force of infinite radius is in function. Each positive mass of a halo repulses all other positive masses of all other halos. Therefore the expansion of the Universe is accelerated more and more electrostatically.

The puzzle of the dark matter is not solved by the shown electric functions.

## 7 Summary: The future of the Universe

Positive and therefore X ray active clustergases sweep away their galaxies in an electrically accelerated expansion and in form of filaments more and more.