the general science journal

Thoughts on the Nebular Theory of our Planetary System Formation

Thierry De Mees

e-mail: thierrydemees (at) telenet.be

The Nebular Hypothesis

The hypothesis of a Solar Nebula, also known as the Kant-Laplace hypothesis, is currently the most accepted explanation for the origin of the Solar System.

The theory was invented by Emanuel Swedenborg in 1734. Immanuel Kant extended Swedenborg's theory further in 1755. He thought that if nebulae and gas clouds rotate slowly, they would slowly contract and flatten under their own gravitational force, and eventually the central star and planets of the solar system would be formed. A similar model was proposed in 1796 by Pierre-Simon Laplace.

According to the hypothesis a planetary system like the Solar System begins as a large, approximately spherical cloud of very cold interstellar gas. Such a cloud is just heavy enough for its own gravitational contraction.

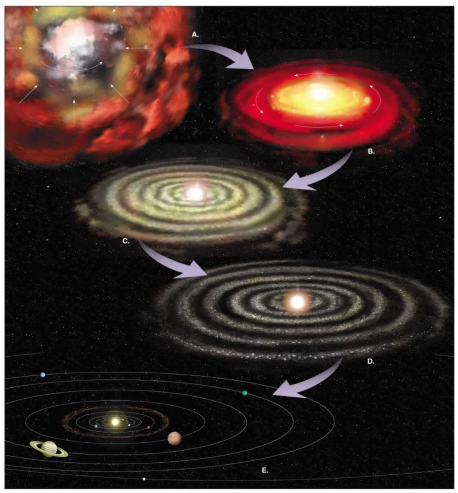

Fig.1 Planetary Nebular Hypothesis, schematically Credits: http://jupiter.plymouth.edu

The nebula becomes hotter, because the kinetic energy of the particles in the nebula increase at the expense of the potential energy in the gravitational field. In the center of mass of the nebula formed an increasingly heavier "protostar" due to contraction.

For the protoplanetary disk, a large number of hypotheses follow subsequently to explain how the small dust would be clumping and form planets.

I enumerate here some of the keywords and key phrases that are usually needed to explain that evolution: turbulence, viscosity, transport of the mass, gas drifting outwards, growth of both the protostar and of the disk radius, mixing of materials, coagulation, gravitational instability, migration to another orbit, fragmentation into clumps, some will collapse, stochastic growth, nearly circular orbits, more eccentric orbits, oligarchic growth stage, natural growth restriction, natural sphere of influence, frost line, by the Solar wind all the gas from the protoplanetary disk is blown away, collisions between protoplanets, the protoplanets disrupt each other's orbits with their gravity, "sweep up" of planetesimals by gravity, stable orbits.

This can't be called one theory. It is made up from a dozen theories. There are numerous totally different suppositions or hypotheses needed to explain the formation of the planets out of a protoplanetary disk.

Although it is clear that the proto-disk hypothesis could be probable for galaxies (at a certain stage of their evolution and in some cases), there is no similitude whatsoever between a galaxy and our planetary system. In the next section, I will enumerate the main problems of the planetary nebular theory.

Criticism of the planetary nebular theory

There are many problems with the theory, or should I say 'theories'.

1) In the first place, a disk of dust doesn't become turbulent just like that. A rotating Sun could create some turbulence close to it, that's all. Let us compare it with a fast spinning star, which gives a clearer view of what really happens. With a fast spinning heavy star in the middle of an accretion disk, the effects are magnified, and we can analyze them closely. The accretion disk, which generally is the remnant of a dead companion star, is influenced by the fast rotation of the, say, clockwise spinning star: close to the spinning star and in the plane of its equator, the accretion material that approaches to it is deviated *counterclockwise*,

in that same plane, and is creating *counterclockwise* vortices. Accretion material that is further away just orbits about the BH with a *decreasing counterclockwise* vortex amplitude. Most of our planets rotate clockwise instead.

2) Even if close to the Sun, the vortices would create friction, collisions and heat, how could such heat be generated at larger distances from the Sun?

3) The accretion disk is radially symmetrical. Close to the star, many counterclockwise vortices occur. There is absolutely no reason to get only one planet at each orbit. Instead, several planets on the same and on several orbits should be able to occur, just like it would be with a disc galaxy.

4) The accretion disk cannot become hot like the Earth's interior, just by kinetic, potential or gravitational action from the Sun. There simply is no critical density involved with such tiny core-planets and there is no strong angular momentum from the Sun that can have been transmitted by gravity to an outside disk, such as it happens in galaxies by their central bulge's stars.

5) It is also highly speculative that the gravitational compression inside the planets alone could heat up their core up to the known temperatures.

6) There is no reason at all to get small and iron-rich planets close to the Sun and large rocky gas-planets far from the Sun.

7) The planets are situated at very large distances from eachother. There is absolutely no reason why there is no dust or no (mini-)planets between them.

8) Jupiter has its Trojan asteroids at fixed distances on its orbit. These asteroids will never form planets or moons and will never disappear. Why are there only these Trojans present and aren't there asteroids close to all the planets, and between them? Is being at Lagrange points a sufficient reason? Why would only Jupiter not be able to eliminate them, but all other planets would instead? Why is the Asteroids Belt present between Mars and Jupiter, but is there no Belt elsewhere between the planets?

9) The theory pretends that matter would migrate from one orbit to another. However, there are huge amounts of energy involved to that. The energy needed to increase the distance between the Earth and the Sun with 10 cm, is 3.5×10^{27} joules. That is 7 million times the total energy consumption by men on Earth per year. Or 3500 times more than what is necessary to heat up all water on Earth with 1 degree Celsius.

10) The theory considers that larger clumped objects would orbit in a circular way and, at the same time, that smaller clumped objects would orbit along an elliptic path. They would then clash and form other configurations. But where does that sudden asymmetry of orbits come from?

11) There is absolutely no foundation of the split into a group of core planets close to the star and a group of gas planets far from the star, by pretending that there would be a natural reason for it. Besides, several exo-gas-planets (hot Jupiters) have been found in the mean time very close to their stars, while their formation by this theory should be far away from the host star.

12) The blowing away of the gas from the protoplanetary disk by the Solar wind is possible, but the "sweep up" of planetesimals by gravity doesn't make any sense, since asteroids are present in the Solar system, be it with a marginal total mass. If asteroids occur at some places and are absent at other places, there must exist a precise reason for it.

It is clear that the theory needs numerous artifacts, whereof none is found by common sense, but instead, only made of screwy fantasy.

But isn't it easy to criticize? If a protoplanetary disk isn't possible, would there be an alternate possibility? We have to look at a solution where not a whole disk, but only a disk sector has been occupied by matter. Why not a solar explosion?

Alternate theory: a Solar explosion?

The Sun is known to be highly magnetic. The sunspots, mainly made of iron and metals, concentrate the magnetic lines by their high magnetic permeability. Between two sunspots, magnetic lines are linked through space.

We know from observation of, for example, the magnetic lines of the Earth, that electrons follow these lines in a special way: they are screwing around the line from one place to another. By their tiny mass and by their electric charge, the screwing path is very close to the magnetic line. The betatron radius is small. With protons, we get a screwing path in opposite direction with loops that are farther away from the line, because of the proton's mass that is much heavier, causing a much larger betatron radius.

It is observed that the Sun is subject to continuous ejections of matter in the shape of loops, which are called prominences or protuberances. There are also solar flares and filaments, which are other forms of prominences and eruptions. All these types of eruptions are governed by the solar magnetism.

The reason why the Sun is very magnetic is the presence of ions inside the Sun. Because of the Sun's heat, most of its matter is ionized.

What would happen if the Sun would locally explode, let's say, if the local conditions at the surface of the Sun would be such, that 0.15% of its mass could be ejected in one event?

Let us gather all the data about the Sun up to now, and relate it to a general solar explosion, eruption, or prominence:

1) the explosion occurs in a magnetic environment, where ionized matter is involved;

2) when magnetic explosions occur, sunspots are found to be involved;

3) ionized matter will follow the magnetic lines and screw, depending from their charge sign in a right or left direction;

If we can set up a scenario that seems to fit, we need a series of tests to check the theory:

1) the Sun's temperature should comply with the resulting dynamics of the final planets;

2) the number of positive and the negative ions must occur in the same quantities in order to get a neutral sum of charges at the end;

3) the distances between the actual planets should comply in some way with the explosion scenario;

4) the chemical composition of the planets should comply in some way with the explosion scenario;

5) the planets' sizes should comply in some way with the explosion scenario.

The scenario

A scenario of a planets' creation would probably have occurred long time ago, in a quite early stage of existence of the Sun.

When keeping in mind the three requirements of a solar explosion, eruption, or prominence, we can start from a huge explosion of a part of the Sun's surface in the neighborhood of a sunspot, entraining the sunspot itself and a large amount of matter around it.

And knowing that there are eight planets, consisting of four core planets and four gas planets, the prominence must have been screwing matter about the magnetic line, consisting of four loops, having a positively charged part and a negative charged part. One charged part started from the sunspot and one charged part started from the sunspot's neighborhood.

The scenario of the Solar protuberance Theory has been fully explained in my book with the same title, and totally supported by classical physics. I summarize the most important parts of it here, without the calculations.

When the loops formed, the beginning and the end of the loop should be smaller than the middle part, just as with the solar prominences in general.

Fig.2 Example of solar flare.

Subsequently, the positive charged loops would repel. So would the negative charged loops. This means that when the loops of each helix are supposed to be equidistant at the start, but with different quantities of matter and charge for each loop, each loop should be repelled by the three other loops. The loops would be ejected from the Sun in space by the repelling Coulomb forces.

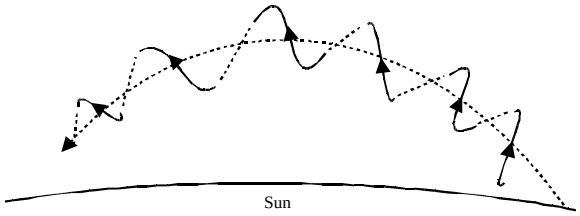

Fig.3 Schematic view of an E-M solar flare of positive charged particles The negative charged particles form a screwing path in opposite direction, very close to the dotted line, which represents the magnetic force line.

It is clear that if a sunspot was involved, these ions would be much heavier with a limited relative amount of electrical charge, while the matter of the sunspot's surroundings, consisting of mainly hydrogen and helium, would be light with a relative high amount of electrical charge in relation to their masses.

This means that the helix loops coming from the sunspot's surroundings would be repelled much farther than the helix loops coming from the sunspot itself.

In fact, the set of core planets are related to a sunspot, while the set of gas planets are related to the sunspot's surroundings. And both sets of loops got opposite charges at the eruption, whereof the total sum must be zero.

The summary of the solar explosion scenario is:

1) a sunspot and its surroundings erupted from the Sun;
   - hence, the eruption followed a magnetic line;
   - hence, it screwed around the magnetic line;
   - hence, a positive charged helix and a negative charged helix erupted, whereof the sum of charges is zero;
2) the followed path formed four loops;
   - hence, one helix corresponded to the four core-planets and one helix to the four gas-planets.

This means that we have only one main assumption and one subsidiary assumption to explain the complete creation of the planets. All the remaining should follow from the electromagnetic behavior of the Sun and the known laws of thermodynamics, dynamics, kinetics and electromagnetism.

Testing the scenario

Test 1: solar temperature vs planetary dynamics

In the first place, we need to test the dynamics of the planets in relation to the available solar energy. I did that by calculating the energy that an atom, ion or gas molecule would get by the Sun's temperature. Then, I equated this energy to the kinetic energy of that particle, which equation contains the average velocity of the gas.

Then, I could relate that velocity to the Sun's temperature and find this velocity, because the temperature and the velocity were the sole variables in the equations. All other parts were constants and natural constants.

Indeed, the erupted matter will have slowed down by the solar gravity. So, a part of the solar escape velocity must be deducted from the raw kinetic velocity to find the actual planetary or-

bits. What remains is the excess velocity for the ejection of the matter, and I found that the excess velocity was in the order of 10^5 meters per second for a matter temperature of 1.5 x 10^7 K (when being at the limit of escaping from the Sun's gravitational influence), or zero meters per second for a matter temperature of 10^7 K which means that, in the latter case, the protoplanets don't totally escape from the solar system. Remark that the generally accepted temperature of the inner Sun is 1.5 x 10^7 K.

Indeed, the solar surface temperature is much lower, but remind that 0.15% of the Sun's mass was ejected to form the planets, so, enormous amounts of matter came from below the surface as well. Hence, even if the calculations were made for gases only, the sunspot and the heavier ions around these gases were entrained by this huge quantity of gases.

Indeed, the eruption so far has been checked by its (thermo)dynamics only, and solely the radial part of the eruption has been considered. Now, the electric helices formed with their four loops of positive, respectively negative charged ions. One helix was made of a melted sunspot and the other of its neighborhood.

This means that the velocity wasn't just radial, but followed the helix path. The excess velocity of the most heated part, the gasses, was higher than zero. In fact, we can estimate the matter velocity by looking at Jupiter's rotation velocity, which is 1.26 x 10^5 meters per second, corresponding to a solar eruption temperature of just below 1.5 x 10^7 K, exactly the inner solar temperature, when we take in account that the planetary system was created 4.5 billion years ago, allowing a slightly slower rotation velocity of Jupiter since then.

The first test is passed with brio!

Test 2: the relative orbit radii of the gas planets

The magnetic lines of prominences generally are hoop-shaped, and the loops of the helix screw about them. The equal charged loops of the helix were repelled by the Coulomb forces as follows: the first loop was repelled by the second loop at a distance D, by the third loop at a distance 2D, and by the third at a distance 3D. The second loop was repelled by the first loop at a distance D in one direction, and by the other loops at distances 2D and 3D in the opposite direction. The sum of the forces gave the final direction of the second loop, probably in the opposite direction.

When we continue that exercise for all four loops, we get a set of equations that show the initial repelling force and the direction of the repel in space, provided that we would know the magnitude of the electric charge of each of the loops.

By equaling these forces to the Newtonian inertial force, we can deduce the initial acceleration for each of the loops. These accelerations are decreasing while the loops fly away and end up in a velocity without accelerations.

Let us begin to analyze the four gas planets. They are mainly made of hydrogen and helium, but an exception exists for Uranus, which consists of rocky material for 30% of its total mass.

If the ratio of mass to electric charge for a hydrogen ion is one to one, for a helium ion it is four to one. For rocky material it is maybe twenty-five to one at low temperatures. But at very high temperatures the ionization is total, so, for a helium ion it is two to one and for rocky material it is two to one as well, caused by the average ratio between neutrons and protons. So, we get a picture for each of the planets of their ratio of mass to their electric charge.

When I put the electric charge of the four gas planets side by side at a mutual distance of D, and I calculate how much the repel force is, I come to accelerations which I can relate to the actual planetary orbit radii as a quotient ratio. In other words, I find the relative initial accelerations of the loops and I know that they relate far well with the final orbit radii of the planets. In the case I would find that the ratios are roughly the same for all the four planets, I got a perfect fit with the theory.

In fact, when I calculate it that way, by putting the loops representing the planets in the sequence they are actually showing up, I get a bad fit. But when I switch the order of the planets into the loops in the following sequence: Jupiter, Neptune, Saturn, Uranus, I get a probability of over 98,8%, without even fine tune the data.

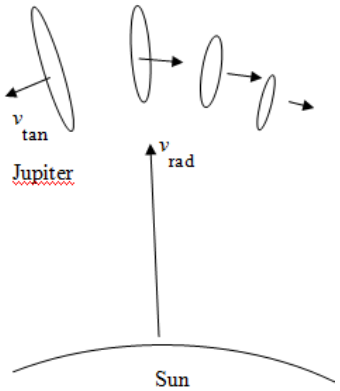

Fig.4 Gas planets repelling mutually.

Possible objections to test 2, and reply

The reader will say that I just searched for a sequence order of the proto-planets that gave the best fit, and that the sequence order isn't directly determined from the theory. That objection is acceptable. But the actual chemical composition of the planets is a strong indicator too. It is logic that the chemical composition transition of the successive loops would be smooth and not random, because the chemical composition of the Sun's area about sunspots is not expected to be totally random neither.

The fact remains that a 98,8% fit between the initial accelerations of the loops and the actual planetary orbit radii is amazing!

The reader could also object that the proto-planets' orbits must have been extremely eccentric. That is indeed possible at their creation. But we also know that the faster orbits go, especially in their perihelion, the more they will lose energy due to the relativity effects (if any), ether resistance effects (if any) and due to the dust friction in space. These effects equalize the speed, and consequently steadily lower their eccentricity to an average circular radius.

Another objection of the reader could be the following. Since the Jupiter loop was supposed to be at one extremity of the helix, the other loops have been ejected in an opposite direction than Jupiter. So, if Jupiter's orbit was for instance prograde, the other

orbits must have been retrograde! In fact, gravitomagnetism, and by deduction GRT, solves that. Gravitomagnetism should be seen as the linearized solution of the General relativity Theory, determined by the Maxwell equations for gravity, wherein the Coulomb force is the equivalent for the Newton gravity force, and so on for the magnetic part as well. I explain shortly what this means for retrograde orbits.

When a central spinning object -here the Sun- got orbiting objects in a retrograde sense -here the planets-, there is an interaction at a distance of the solar angular momentum with the planets. The spinning Sun gets a magnetic-like gravity field just like a magnet with a north- and a south pole, and the magnetic lines are similar, from north to south, in a hoop. Let's call them here "g-magnetic lines". When an orbiting object crosses the g-magnetic lines, a Lorentz force acts on it, just as with an electron that crosses magnetic lines of a magnet.

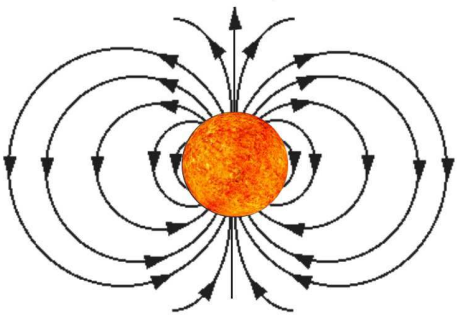

Fig.5 Gravito-magnetic lines of the Sun.

The Lorentz force is a vector product between the speed of the planet and the magnetic line, which is pointed downwards if the Sun's north pole is on top of our picture. This Lorentz force is responsible for the flatness of galaxies and of the Solar system, because it transmits the angular momentum through gravity in space to the surrounding orbiting objects, and continuously force these orbits to rotate in the same direction of the Sun, prograde.

The result with a retrograde orbit is a steady deviation of the orbit in such way that it slowly swivels, as a whole, around an axis that is the intersecting line between the Sun's equator and that orbit. The orbit then swivels towards the poles, then swivels beyond the poles and arrives to the other side of the poles, where the formerly retrograde orbit becomes prograde by definition.

It appears from the above that the second test stands with brio as well.

Test 3: the relative orbit radii of the gas planets

Although the test with the gas planets was excellent, we still need to test the same for the core planets.

I also calculated the mass to charge ratios by roughly estimating that the ionization of the proto-core-planets is identical for all the core-planets for all the chemical components. With this simple start, and when taking the loops' sequence of Earth, Venus, Mars, Mercury, I again come to a fit probability of 98,8% between the initial accelerations of the proto-planets and their actual orbit radii!

Since I reply to the possible objections in the same way as with the gas planets, I don't mention them here.

Test 4: mass to electric charge ratios for the planets

In this test, I will try to prove that the core-planets and the gas-planets must have been created at the same time in a double helix of positive charged and negative charged helices. As I said before, I claim that the core-planets come from a sunspot and its immediate surroundings. So, I will tend to prove that the electrons of the burst entrained the liquefied sunspot, creating so the core-planets, and also, that the protons of the burst entrained the gasses in the neighborhood , creating so the gas-planets.

This amazing part of the scientific work needs a starting point. The basic assumption is that the protons' speed involved in the positive charged helix was the same as the electrons' speed involved in the negative charged helix. In other words, the whole eruption occurred at one initial speed. Nothing weird to that.

Furthermore, I find several important relationships based upon the above:

1) The totality of the ionized electrons is related to the creation of the core planets through a balance of impulsion moments that perfectly fits.

2) When considering all the electrons being ionized, I find that the mass of the ejected sunspot equals about 12 x 10^{24} kg, which is nearly exactly the mass of the core planets!

In other words, also this test has been passed with brio!

The results of the tests are written down in my former papers, which the reader will find in the references list below.

References

1. De Mees, T., Are Venus' and Uranus' Tilt of Natural Origin? , General Science Journal, 2005
2. De Mees, T., The Titius-Bode law shows a modified proto-gas-planets' sequence, General Science Journal, 2007
3. De Mees, T., Is the Earth a former solar sunspot?, General Science Journal, 2007
4. Jefimenko, O., 1991, Causality, Electromagnetic Induction, and Gravitation, Electret Scientific , 2000.
5. Heaviside, O., A gravitational and electromagnetic Analogy, Part I, The Electrician, 31, 281-282, 1893
6. High Altitude Observatory, http://www.hao.ucar.edu/
7. Jet Propulsion Laboratory, http://ssd.jpl.nasa.gov/
8. National Solar Observatory, Sacramento Peak, http://www.sunspot.noao.edu/
9. National Solar Observatory, Sacramento Peak, http://www.sunspot.noao.edu/
10. John W. Morgan, Edward Anders, Chemical composition of Earth, Venus, and Mercury; Geophysics, 1980.
11. L. Gilpin et al., Melting of a model orthopyroxene-rich Martian mantle at 2.0 GPa; Lunar and Planetary Science 2001.
12. Astronomical Institute, Universiteit Utrecht, http://www.astro.uu.nl/
13. Bart Laplae, Private correspondence