

Jean-Pierre Petit

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2 mai 2021

When arXiv refuses to put online articles published in mainstream journals.

Now retired, but still active, I have published about 100 papers in high level peer-reviewed journals in the following fields:

- Fluid mechanics, plasmas, magnetohydrodynamics
- Mathematics (geometry, sphere and torus inversion)
- Astrophysics (dynamics of galaxies)
- Cosmology

Since 1994 I lead a research team whose activity is focused on the construction of a cosmological model including negative masses and on questions of theoretical physics.

From 2014 a precise and coherent geometrical context could be built, based on a couple of coupled field equations, taking the relay of the general relativity model, which is based on a single equation, that of Einstein. This system allows to avoid the runaway phenomenon, by being built to satisfy the principle of equivalence between gravitational mass and inertial mass.

The Newtonian approximation then gives the following interaction laws:

- Masses of the same sign attract each other according to Newton's law
- Masses of opposite signs repel each other according to "anti-Newton".

This model, to which we have given the name of "Janus", produces numerous observational confirmations.

If we consider, as will be justified later, that the environment of the solar system contains practically no negative mass, the first equation then becomes identical to Einstein's. As a consequence:

1 *The model is consistent with local relativistic observations:*

Mercury perihelion advance, gravitational lensing effect due to the Sun

Some researchers are beginning to consider the possible existence of "a second universe, which would be located on the other side of the Big Bang, CPT-symmetric of ours".

The Janus model consists in using the tools of topology by "folding" this structure, and by giving it that of a two-folds covering of a four-dimensional manifold, these adjacent folds being then equipped with their own metric.

The Janus model is therefore a bimetric model.

Using then the tools of the theory of dynamic groups, forged in 1970 by the French mathematician Jean-Marie Souriau (J.M.Souriau, Dynamical groups, Ed. Birkhauser 1997) we link the inversion of the time coordinate to that of mass and energy.

By taking up the ideas of the Russian Andrei Sakharov (1967), by supposing, as he did, that like matter and antimatter of positive mass, negative masses and anti-masses are formed from quarks and antiquarks of negative energy, and that the annihilation of the negative mass matter-antimatter pairs left a remnant of negative mass anti-matter, associated, in a 3/1 ratio, to a corresponding remnant of negative energy quarks, we can then give a precise identity to the invisible components in the universe.

It is then :

- Anti-hydrogen of negative mass
- Anti-helium of negative mass

Bathing in a set of photons of negative energy.

2 : *This solves the paradox of the non-observation of primordial antimatter.*

The scheme of cosmic history is then articulated in the following way:

The two entities, of positive mass and energy on the one hand, of negative mass and energy on the other hand have their own set of physical constants:

- Speeds of light $c^{(+)}$ and $c^{(-)}$
- Constants of gravitation $G^{(+)}$ and $G^{(-)}$
- Planck's constants $h^{(+)}$ and $h^{(-)}$
- Elementary electric charges $e^{(+)}$ and $e^{(-)}$
- Elementary masses $m^{(+)}$ and $m^{(-)}$
- Magnetic permeability constants of vacuum $\mu^{(+)}$ et $\mu^{(-)}$

By associating their variations with their own space and time scale factors $a^{(+)}$ and $a^{(-)}$, $t^{(+)}$ and $t^{(-)}$ through a generalized gauge law ensuring the invariance of the laws of physics (which are the same in both sectors) we obtain two joint evolutions, "with variable constants". In contrast to the numerous attempts made by other authors, these do not violate Lorentz invariance.

Everything starts from a totally symmetrical initial situation. Then, during the radiative phase an instability is the source of a strong dissymmetry. In particular :

$a^{(+)} \gg a^{(-)}$: distances are shorter in the negative sector

$c^{(+)} \ll c^{(-)}$: the value of the speed of light is higher there.

The two are related by the gauge relation: $a^{(+)}c^{(+)^2} = a^{(-)}c^{(-)^2}$. It is further found that the cosmological horizons vary as the space gauge factor in both sectors.

This ensures the homogeneity of the two sets during the whole radiative phase..

3 : *This is therefore an alternative to the inflation model.*

When matter dominates in both sectors, the constants become invariant. One then constructs, through an exact solution of the system of the two coupled field equations, the two laws of joint evolution of the two sectors, i.e. :

$$a^{(+)}(t^{(+)}) \text{ and } a^{(-)}(t^{(-)})$$

An observer with positive mass observes in his own sector an accelerated expansion $a^{(+)}$, while an observer with negative mass would observe a decelerated expansion.

4 : *The acceleration of the cosmic expansion is thus explained,*

without the need for a cosmological constant. This is due to the negative energy of the dominant negative mass.

A la différence du modèle Λ CDM, qui se traduit par une croissance exponentielle, le modèle Janus débouche dans les deux secteurs sur des croissances linéaires, avec des indices de courbure $k^{(+)} = k^{(-)} = -1$

5 : *The model predicts a future with an expansion of the observable sector linear in time.*

Joint gravitational instabilities separate populations of opposite masses. The negative mass density being negligible in the vicinity of the Sun the first equation is then identified with the Einstein equation. So the same predictions of the advance of Mercury's perihelion and of the gravitational lensing effects in the neighborhood of the Sun.

6 : *The model fits the relativistic observations in the solar system.*

Joint gravitational instabilities give rise to the very large scale structure of the universe. The negative mass, endowed with a lower Jeans time, forms the first a system of conglomerates of negative mass, regularly spaced. The positive mass settles in the residual space, which gives it a lacunar structure.

7 : *The model fits with the lacunar structure of the observable universe.*

This positive mass is then rapidly compressed along flat structures and heated, but this geometry ensures a no less rapid radiative cooling. Thus destabilized, the positive mass gives birth to all galaxies, at the same time.

8 : *The model provides another scheme of galaxy formation.*

The negative mass is also heated but does not have the opportunity to benefit from such radiative cooling. One can compare these clusters to huge protostars whose cooling times exceed the age of the universe. An observer made of negative mass would then see these spheroidal conglomerates weakly radiating in the red and infrared. Such radiation, of negative

energy, is not perceptible for optical instruments made of positive mass. These conglomerates are therefore invisible. The Great Repeller, discovered in 2017, is one of them.

9 : *The model is the only one that explains the Great Repeller phenomenon.*

However, there is a phenomenon that reveals the presence of these objects, which exerts on photons of positive energy a negative gravitational lensing effect, reducing the luminosity of objects located in the background.

The galaxies with $z > 7$ are not dwarf galaxies, but galaxies of normal size, whose luminosity is reduced by this effect. More precise measurements in the Great Repeller region should eventually reveal its diameter.

10 : *The model is consistent with observations of high redshift galaxies.*

A mathematical model of galaxies derived from a solution of a set of two Vlasov equations coupled by the Poisson equation provides a model of finite mass galaxies, confined by the surrounding negative mass field, offering circular gas orbit velocity laws in agreement with observations. The velocity excursions in the central parts reveal the cannibalism that presided over the formation of the galaxy.

The shape, flat in the periphery, of the rotation curves is thus explained, without resorting to a halo of positive mass, of a hypothetical dark matter.

11 : *The model explains the shape of the rotation curves.*

The clusters of galaxies correspond to mathematical solutions with spherical symmetry. We obtain a model of clusters (and globular clusters) of finite masses.

12 : *The model explains the high random velocities of galaxies in clusters.*

We show that the gaps in the negative mass distribution are equivalent, in negative, to equivalent positive masses, that these gaps generate a negative gravitational lensing effect.

13 : *The model explains the strong gravitational lensing effects observed.*

We explain why we cannot construct a Poisson equation, as a linearized form of the field equation, for a uniform matter distribution, because of the non-existence of a gravitational potential.

Numerical simulations have allowed to show spiral structures, by dynamic friction effect between galaxies and their negative mass environment, which last for tens of turns. Weakly present in the stellar ensembles, this disturbance, density wave, generates a strong response, non-linear, in the gas.

14 : *The model explains the spiral structure of galaxies.*

This interprets the spiral structures of galaxies as dissipative process in non-collisional systems, free of the heat and momentum transfer phenomena of collisional systems.

Before decoupling in both sectors, radiation dominates in both sectors. If we try to extend the theory of Jeans gravitational instability to a medium where the gravity field is solely due to radiation, we find a Jeans length which is of the order of the cosmological horizon. This argues for a form of multiverse where our universe is surrounded by joined "cells" resulting from this

gravitational instability in the radiative era, with different sets of constants, but obeying the same physical laws.

This is also true for the negative world. But in this one the cosmological horizon is smaller. The fluctuations that occur at this wavelength act on the positive world by eliciting a weak response, given the "rigidity" of the photon gas. These weak fluctuations correspond to the observations of the universe in its primitive stage.

15 : *The model accounts for small fluctuations in the CMB.*

As in this early universe the cosmological horizon is equal to the scale factor, we deduce, based on the characteristic wavelength of the observed fluctuations that :

$a^{(+)}$ of the order of $100 a^{(-)}$

$c^{(-)}$ of the order of $10 c^{(+)}$

In the negative world the distances to be covered are thus one hundred times shorter and the speed of light ten times higher. Hence a potential reduction in travel time of three orders of magnitude.

16 : *The model makes interstellar travel not impossible.*

The work also included a re-examination of the two solutions published by Karl Scharzchild in 1916. Paradoxically, a paper published in Modern Physics Letters A in 2015 is the only one that passed through arXiv's automated censoring system:

J.P.Petit , G,d'Agostini:

**Cancellation of the central singularity of the Shwarzchild solution
with natural mass inversion process**

<https://arxiv.org/abs/2103.12845>

This work shows that this geometry corresponds to a "space bridge" between two PT-symmetric universes, to what is called an "orbifold". A close examination of Schwarzschild's work shows that when a neutron star increases in mass, a physical singularity (density and speed of light becoming infinite) occurs before a geometric criticality intervenes. It is suggested that a natural mechanism of mass inversion would occur in the core of the star, allowing the dispersion of the inverted mass, as soon as it interacts with the positive mass only antigravitationally, maintaining the object in a subcritical situation with a mass limited to:

$$\text{subcritical mass} = \left(\frac{8}{9}\right)^{3/2} \frac{2 G M}{c^2} = \frac{1.66 G M}{c^2}.$$

The so-called giant black holes at the center of galaxies would be objects in subcritical situation, producing however images showing a dark disk at the center, due to gravitational redshift. Dark but not completely black.

17 : *The model accounts for the image of the object at the center of M87.*

The team suggests that this process of inversion of time and mass would occur when we go back in the cosmic past. Thus there would be no pre-Big Bang.

18 : *The model solves the question of "before the Big Bang": at this point, time is reversed.*

Research program:

The team proposes to show, from the system of field equations, a phenomenon of *joint fluctuations of metrics*, which would be particularly important in the primitive phase but would continue today. Such a phenomenon would have the effect of generating a variation of the "apparent mass of the other sector".

First scenario: the weakening of this mass weakens the "corset" of negative mass that confines the galaxy. This one explodes, breaks up completely.

The model would explain the existence of "irregular galaxies" identified by Arp.

Second scenario: the reinforcement of the confinement effect generates the birth of a centripetal density wave, comparable to a tsunami. This wave, like the spiral density waves of galaxies, would have the nature of a shock wave, destabilizing the gaseous mass and causing the creation of stars.

This would interpret the images of Hoog ring images galaxies.

This annular gaseous mass, converging towards the galactic center, would ionize the medium by UV emission (like the spiral structure) would gather at the galactic center the field lines of the weak magnetic field pre-existing in the galaxy (around a microgauss). The phenomenon would result in the creation at the center of the galaxy of a gaseous mass whose diameter would be of the order of a solar system and where the temperature would largely exceed that of hydrogen fusion. This mass would then create more energy than the galaxy that hosts it. The emitted plasma would follow the dipolar geometry of the magnetic field and would be emitted in two symmetrical lobes.

This would constitute a model of quasar.

The magnetic field gradient, extending over several galactic diameters, would constitute a natural particle gas pedal, conferring a very high energy to them.

The model would explain the origin of "cosmic rays".

The phenomenon would be of "relatively short duration", on the scale of cosmic time. Once the energy emission has calmed down, the object, spheroidal, could be compared to a protostar, the implosion being opposed by the forces of pressure, within the plasma and magnetic. The geometry of such objects would be limited to its subcritical configuration.

Successive excursions of "apparent mass" could result in an increase of this mass, confined in a restricted space.

This would constitute the nature of hypermassive objects located at the center of galaxies.

Theoretical physics:

The theory of dynamical groups based on the complete Poincaré group associated the operation "inversion of time" to the inversion of mass and energy. The Janus model was accompanied by an extension in 5D of this complete Poincaré group, translating the link between the two sectors by CPT-symmetry.

In quantum mechanics it is different. There are then P and T operators, of space and time inversion, which can be:

- Either linear and unitary

- Either anti-linear and anti-unitary.

In classical quantum field theory, choices of P anti-linear and anti-unitary T linear and unitary lead to the emergence of negative energy states. This theory, considering them as non-physical, arbitrarily opts for the choice:

P linear and antiunitary T antilinear and unitary

This choice may have seemed legitimate until 2011, when a Nobel Prize was awarded to Perlmutter, Rees and Schmidt for the demonstration of cosmic expansion under the effect of a negative pressure.

But a negative pressure is also a volume density of negative energy (aka "dark energy"). This leads us to reconsider this choice and to extend quantum mechanics to the study of negative energy states, which is the research program of a member of the team, the Belgian mathematician Nathalie Debergh, specialist in the mathematical foundations of quantum mechanics. She is the author in 2018 of a first paper on the generation of these states via the Dirac equation. N.Debergh, J.P.Petit, G.Dagostini :

On evidence for negative energies and masses in the Dirac equation through a unitary time-reversal operator . Journal of Physics com. . **2** (2018) 115012 : arXiv :1808.0546v2 (quantum-phys) 7 nov. 2018

19 : *First breakthrough concerning quantum mechanics and negative masses and energies*

Her ambitious work will be prolonged by the extension of quantum field theory jointly to both sets, positive and negative energies.

We both conjecture that this approach should have among other things the following consequences.

The quantization of gravitation.

In these conditions, it is particularly shocking that all these works have been blacklisted by the arXiv platform, which now goes so far as to refuse to put online articles already published in mainstream journals. Witness the following mails dated May 1, 2021:

We write to the different personalities involved in the functioning of the arXiv platform:

Dear Colleagues,

We have been using the arXiv platform for a long time to place preprints of our articles. Initially I had been sponsored on the "gen-phys" section (general physics) and I had installed some articles there, as you can see on my account, in this section.

In 2014 our theoretical work had a new impulse and I then tried to upload these new developments on arXiv. To my surprise this work was immediately blocked, with the mention "on hold". When I asked the question, the automatic answer I got was that "one or more moderators were reviewing my paper".

After several months, the conclusion was clear: it was an open-ended block.

In the following two years I then tried to upload sixteen new articles (...), representing the developments of our Janus cosmological model, under different aspects. These articles were all blocked. My arXiv account then showed 17 articles "on hold".

Finally arXiv proceeded to delete all these papers and I was told "that I should not try to download these papers again, or I will lose access to arXiv" (...). The message added "that I should first publish papers in mainstream journals before attempting to publish them on this platform" (...).

This seemed absurd to me since arXiv is supposed to have been created to host "preprints" and not "postprints".

Three years have passed. Having been able to be sponsored in the "gr-qc" section, more appropriate to our scientific production, I tried to position in July 2020 a first article, published in the journal *Astronomy and Space Science* in 2014. To my great surprise this article was immediately blocked, and it still is. I should point out that we complied with arXiv's wish to send articles composed in Latex, so as to facilitate their analysis by the platform, with the exception of one, published in 1994 by the magazine *Nuovo Cimento*, whose conversion into Latex is in progress. We will send you this convertes file as soon as it has been done

So we have sent four new articles, in this form, all duly published in the mainstream journals « *Nuovo Cimento* », "*Astrophysics and Space Science*" and "*Modern Physics Letters A*". Three of them have been blocked, for months, but the fourth, the last of these four, suprizingly, went through without any problem.

Finally, more recently, we tried to position the preprint of an important review article, also in Latex, which was immediately blocked.

It seems to us that this reflects an inconsistency and a malfunction, perhaps attributed to local correspondents, or to a robotic system.

Can you remedy this problem?

Attached are the five articles concerned, including four composed from the Latex format.

Sincerely yours

J.P.Petit, G.D'Agostini, N.Debergh

Manaty Research Group

Joined files :

Name of the file : 1994-Nuovo-CimentoB.pdf

Title of the paper : J.P.Petit « The missing mass problem » Nuovo Cimeto 109B,n°7

Submitted and on hold. The only one not yet converted into Latex. To be done soon.

Name of the file : 2014-AstroPhysSpaceSci.pdf. Formed from Latex. Submitted and on hold

Title of the paper : J.P.Petit & G.d'AGOSTINI : Negative Mass hypothesis in cosmology and the nature of dark energy. Astrophysics And Space Science,. A **29**, 145-182 (**2014**)

Name of the file : 2014-ModPhysLettA. Pdf formed from Latex. Submitted and on hold.

Title of the paper : J.P.Petit, G.D'Agostini : Cosmological Bimetric model with interacting positive and negative masses and two different speeds of light, in agreement with the observed acceleration of the Universe. Modern Physics Letters A, Vol.29 ; N° 34, **2014** ; Nov 10th

Name of the file : 2015-AstroPhysSpaceSci/pdf. Formed from Latex. Submitted but on hold.

Title of the paper : J.P.Petit & G.D'Agostini : Lagrangian derivation of the two coupled field equations in the Janus Cosmological Model. Astrophysics and Space Science **2015**, 357 :67

Name of the file : 2018-AstroPhysSpaceScie.pdf. Formed from Latex. Submitted but on hold

Title of the paper : G. DAgostini and J.P.Petit : Constraints on Janus Cosmological model from recent observations of supernovae type Ia, Astrophysics and Space Science, (**2018**),

Name of the file : 2021-Janus-Cosmological-Model.pdf Formed from Latex. Submitted but on hold.

Title of the paper : J.P.Petit , G.d'Agostini, N.Debergh : Bimetric models. When negative mass replaces both dark matter and dark energy. Excellent agreement with observational data. Solving the problem of the primeval antimatter.

Already installed on arXiv in the (gr-qc) section :

J.P.Petit & G.D'Agostini : Cancellation of the singularity of the Schwarzschild solution with natural mass inversion process. Mod. Phys. Lett. A vol. 30 n°9 **2015** <https://arxiv.org/abs/2103.12845>

Joint pdf files:

- 1 - J.P.Petit « The missing mass problem » Nuovo Cimeto 109B,n°7
- 2 - J.P.Petit & G.d'AGOSTINI : Negative Mass hypothesis in cosmology and the nature of dark energy. Astrophysics And Space Sccience,. A **29**, 145-182 (**2014**)
- 3 - J.P.Petit, G.D'Agostini : Cosmological Bimetric model with interacting positive and negative masses and two different speeds of light, in agreement with the observed acceleration of the Universe. Modern Physics Letters A, Vol.29 ; N° 34, **2014** ; Nov 10th
- 4 - J.P.Petit & G.D'Agostini : Lagrangian derivation of the two coupled field equations in the Janus Cosmological Model. Astrophysics and Space Science **2015**, 357 :67
- 5 - G. DAgostini and J.P.Petit : Constraints on Janus Cosmological model from recent observations of supernovae type Ia, Astrophysics and Space Science, (**2018**),
- 6 - J.P.Petit , G.d'Agostini, N.Debergh : Bimetric models. When negative mass replaces both dark matter and dark energy. Excellent agreement with observational data. Solving the problem of the primeval antimatter.

Already installed on arXiv in the (gr-qc) section :

- 7 - J.P.Petit & G.D'Agostini : Cancellation of the singularity of the Schwarzschild solution with natural mass inversion process. Mod. Phys. Lett. A vol. 30 n°9 **2015**

Those files can be downloade dar :

- 1 : <http://www.jp-petit.org/papers/cosmo/1994-NuovoCimentoB.pdf>
- 2 : <http://www.jp-petit.org/papers/cosmo/2014-AstrophysSpaceSci.pdf>
- 3 : <http://www.jp-petit.org/papers/cosmo/2014-ModPhysLettA.pdf>
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- 5 : <http://www.jp-petit.org/papers/cosmo/2018-AstroPhysSpaceSci.pdf>
- 6 <http://www.jp-petit.org/papers/cosmo/2021-Janus-Cosmological-Model.pdf>
- 7 <https://arxiv.org/abs/2103.12845>

A few hours later we received the following response from one of the arXiv managers, Jim Entwood: jira@arxiv-org.atlassian.net

Dear J. P. Petit,

There are a two items I will be addressing in this message. One is a response to your message below and the second is a follow up on your submissions.

The message you sent today appears to be a spam message to moderators is not an appropriate form of communication. All communication should be sent to our moderation support portal or by email at moderation@arxiv.org. Contacting individual or groups of moderators directly is not appropriate. Repeated spamming of arXiv volunteers by a user will result in the suspension of submission privileges.

As for your submissions I do apologize for the delay in decision making. We had limited moderator availability over the past few months. Your papers were unfortunately not alone in having delays, some of which go back many months.

I did check this morning and we do have a decision :

We regret to inform you that arXiv's moderators have determined that your submissions will not be accepted and made public on arXiv.org. Each work has been considered on an individual basis by multiple moderators. Our moderators have determined that the submissions are not of plausible interest for inclusion within arXiv, even as we acknowledge that some are published.

The decision applies to the following submissions.

submit/3707747 : Bimetric models. When negative mass replaces both dark matter and dark energy. Excellent agreement with observational data. Solving the problem of the primeval antimatter.

submit/3664519: Lagrangian derivation of the two coupled field equations in the Janus cosmological model.

submit/3664506: Cosmological bimetric model with interacting positive and negative masses and two different speeds of light, in agreement with the observed acceleration of the Universe.

submit/3658856: Negative mass hypothesis in cosmology and the nature of dark energy.

submit/3445980: Constraints on Janus Cosmological model from recent observations of supernovae type Ia.

submit/3442281: On evidence for negative energies and masses in the Dirac equation through a unitary time-reversal operator.

submit/3421728: The missing mass problem

For more information about moderation, including appeals, please see <https://arxiv.org/help/moderation>.

arXiv moderators strive to balance fair assessment with decision speed. We understand that this decision may be disappointing, and we apologize that, due to the high volume of submissions arXiv receives, we cannot offer more detailed feedback.

We appreciate your interest in arXiv and wish you the best.

Sincerely,

Jim Entwood
arXiv Operations Manager

Immediately, the names of the submitted but rejected papers were deleted from my arXiv account:

Your arXiv.org account: petit#6

E-mail: jppetit1937@yahoo.fr Affiliation: retired from cnrs. head of the manaty research group
 Name: Jean-Pierre Petit URL: http://www.savoir-sans-frontieres.com/
 Default Category: astro-ph.CO Country: France
 Groups: physics Career Status: Professor

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submit/3445980	New	Constraints on Janus Cosmological model from recent observations of supernovae type Ia	on hold	[icon] [X]		
submit/3658856	New	Negative mass hypothesis in cosmology and the nature of dark energy	on hold	[icon] [X]		
submit/3664506	New	Cosmological bimetric model with interacting positive and negative masses and two different speeds of light, in agreement with the observed acceleration of the Universe	on hold	[icon] [X]		
submit/3664519	New	Lagrangian derivation of the two coupled field equations in the Janus cosmological model	on hold	[icon] [X]		

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Your arXiv.org account: petit#6

E-mail: jppetit1937@yahoo.fr Affiliation: retired from cnrs.
 Name: Jean-Pierre Petit URL: http://www.savoir-sans-frontieres.com/
 Default Category: astro-ph.CO Country: France
 Groups: physics Career Status: Professor

2021 may 2

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