Neutrinos, Neutron Stars, and Axions

Spiraling Around the Central Topic of Electric Current on Stellar, Nebular, Galactic, and Supra-galactic Scales

Sf. R. Careaga, BSEE, MSTOM
January, 2019

ABSTRACT

Axions and neutrinos represent “well-motivated” models in the search for Cold Dark Matter. However, both are being constrained repeatedly by the actual search process. Also, in the discussion of exotic matter, neutron star behavior demonstrates unequivocal electromagnetic behavior which favors not gravitational collapse but Marklund convection as a means of pulsar generation. With several legs of the Standard Model (SM) failing under the Big Bang Cosmological family of astrophysics, plasma related cosmological paradigms stand to gain much advancement from the work of projects like NuSTAR, ADMX, and NICER. However, careful review of the data will be needed to look out for attempted obfuscations or excuse-making which yields good data useless in the hands of a throw-away cosmogony. Instead, it is best to utilize the research for confirmative purposes in the Plasma-electromagnetic paradigms.

Keywords: *Axion - Neutrino - Neutron Stars - Magnetic Current - Dark Matter*

Updates on Neutrino//Dark Matter Search

Only recently, the author reviewed one proposal to search for acoustic shockwaves generating neutrino decay.[1] The author had a fairly favorable opinion of this search proposal. The quoted author also clarified, in communications with this author,

> "*The neutrinos I am searching for would have been the result of the decay of neutrons or neutron-like particles. By now, the kinetic energy of those neutrinos would have diminished to less than 1 electron volt as space expanded... akin to the diminished photonic energy of the CMB.*
>
> *"I propose exploring the dynamic physical properties of the medium of space first. The more we explore them while engaging the effects, the cleaner will be the path to later understanding its composition. We are looking for primordial relic neutrinos as evidence of primordial relic neutron disintegrations. When using the word acoustics, it does not mean 'sound' as in the ordinary sense. Shockwaves can be sound as in air or water pressure waves. They can also be in any sort of medium.... The neutrino kinetic energies should show a similar expansion degradation like the CMB from their initial 0.782343 MeV to less than 1 e-Volt." ~W. Giordano, via email*

Since then, however, a paper was released that further constrained "Sterile Neutrino Dark Matter,"

> *"We use a combined 1.2 Ms of NuSTAR observations of M31 to search for X-ray lines from sterile neutrino dark matter decay… **We find no evidence of unknown lines**, and thus derive limits on the sterile neutrino parameters. Our results place stringent constraints for **dark matter masses >= 12 keV**, which reduces the available parameter space for sterile neutrino dark matter produced via neutrino mixing (e.g., in the vMSM) by approximately one-third."*[2]

That pretty much sums itself up (excellent abstract). The paper is complicated, and summarizes the NuSTAR team's efforts. Actually they found constraints as low as 5 keV, but set the main constraints at 12-20 keV, though they went as high as 100 keV. But as discussed in part 5, "Dark Matter Scatter,"[3] the goal may be to eliminate small ranges, in a kind of "keep away" game that realistically has no end. Nevertheless, for now, the neutrino discussion is effectively [partially] neutralized.

Neutron Star research pile-drives itself into PEMC

As mentioned in the last paper, as well, DM research has not inhibited PEMC (though it hasn't been the most efficient way to do the research, financially speaking and timewise). But it is, nevertheless, frustrating when the research in the Standard Model (SM), within Big Bang tries to skirt around the issue of Birkeland Currents, and (like a trapeze artist riding a unicycle balancing plates on poles on their nose) attempts to explain the return currents while hand-waving and calling it magnetic flux ropes, magnetic currents (a sure misnomer), and distracting the reader from the obvious question: **how can neutral material generate charge separation!?**

They immediately answer, in a new paper that is as close to forehead smacking as SM gets,

*"The primary targets are isolated, **rotation-powered pulsars**, in which the surface polar caps are heated by bombardment from magnetospheric currents of **electrons and positrons**."*[4]

---

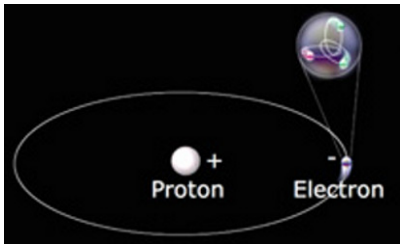
[1] [13]
[2] https://arxiv.org/pdf/1901.01262.pdf
[3] [16]
[4] https://arxiv.org/pdf/1901.01274.pdf

The paper by the NICER team, once you get passed the assumptions, hubris[5], and missteps[6] … an excellent PEMC paper, masquerading as a BBC paper:

"2. CHARGED PARTICLE ENERGY LOSSES IN A PLASMA

***Energetic electrons and positrons** can interact with the particles of a plasma in several different ways. They can scatter directly off both the electrons and the ions in the plasma, or **they can excite plasma waves**. Additionally, particles can lose energy via the emission of Bremsstrahlung radiation as they pass near ions in the plasma. In this section, we will discuss the dominant interaction mechanisms and calculate the energy loss rate of both electrons and positrons traveling through a hydrogen plasma. **The return current electrons and positrons we consider here are moderately to highly relativistic** (γ ~ 2 to γ ~ 500). The electrons in the neutron-star atmosphere, in contrast, have **energies near 1 keV**, corresponding to γ ~ 1.004. Therefore, we can make the assumption that the **plasma electrons and ions are essentially stationary compared to the return current particles**. The first channel for energy loss is via binary interactions with the free electrons (Møller scattering or Bhabha scattering for electrons and positrons, respectively) and the ions in the plasma. Since the cross-section for the scattering interaction is inversely proportional to the mass of the target, **we neglect the electron-ion and positron-ion scattering terms and calculate only the scattering with the plasma electron**s. In addition to direct scattering, the relativistic particles excite collective plasma modes (Langmuir waves) and thereby transmit additional energy to the atmosphere. Direct scattering and excitation of **Langmuir waves dominate the energy loss rate for particles passing through a neutron star atmosphere**." p.3 (emphasis added)*

Figure 1: proposed neutron



Firstly, the author would like to remind the reader of the likely incorrect model of the nucleus of the atom.[7] While we understand the behaviors of the valence shells and probabilistic wave-functions governing discrete quantized behavior in a QED/QDM model of the atom… in all likelihood the SM understanding of the nucleus is flat out wrong.[8] The author, therefore, favors the Structured Atom Model (SAM)

[5] *"One of the key results of these studies has been that accurate interpretation of the pulse profiles* [did we send a probe?] *relies on a good understanding of the properties of the stellar atmosphere* [doubtful, since spectrology is an art, and there's almost no good understanding of our own star, let alone distant ones] *and, in particular, on the dependence of the emitted spectrum of radiation on the angle from the normal to the stellar surface." p.2 (emphasis added)*
The author can think of no instance in science or regular life where you can arrive at certain truth from **only an orthogonal perspective**.

[6] *"There has been, however, no effort so far to calculate the temperature profile of the bombarded neutron-star atmosphere and the resulting spectrum and beaming of the surface emission… The physics of radiative cooling in[side] neutron-star atmospheres is well understood..." p. 2*
The atmospheres of our planets are not well understood… our own atmosphere is not "well understood!" What an absurd and asinine statement, very arrogant of the authors!

[7] https://www.youtube.com/watch?v=sJKW9VNo2BU

[8] Just as the photon is **definitely** wrong, see [12]

[9]. Firstly this means that “neutrons” are merely a shorthand for electron-proton[10] close orbits[11] (and hence the higher order of magnitude of force, as measured in energy, for the “Strong Force” and “Weak Force”). See Figure 1. Granted, this would require that the remaining mass (not inertia, but energy) would need to be found in terms of the charge, not merely in subtraction but in actual measurement of the inside of the neutron. So far, this has not materialized. To the author, this is only a matter of time and improvement in QEM.

What needs to be focused on, however, is the glaring obviousness of the above discussion. They are describing electric currents, and ***calling them magnetic currents*.** Let’s be clear: magnetism itself does not “flow”, it waves, and concentrates or dilutes. When one speaks of magnetic flux, such as in a transformer, it must be born in mind this is a model, a device. But if one uses iron filings, magnetic fields may alternate but they are not flowing, and the filings will not move with the field. It is a mathematical concept from Maxwell/Gauss. In magnetohydrodynamics, magnetism is treated like a fluid, and thus made to flow, but this is still after all a model of convenience, as stated also by Alfvén himself. The fact is that the actual flow is electrical. Electric currents are found to be flowing in and out of AGN[12], black holes, stars, planets, etc…

What is disturbing about this trend is that, despite evidence showing that such “magnetic flux ropes” (Birkeland currents) are shown to not be *directly* powered by Saturnian or Jovian rotation[13] [14], but by internal currents and magneto-motive moments.[15] The cores, and their reaction with the atmospheres and the solar wind, appear to be the source of the currents. Yet, in pulsars, the mechanism is supposed to be rotation. But, neutrons have no mechanism for sudden accumulation[16] and no reason for mutual attraction.[17] Furthermore pulsars rotate excessively fast[18] which will not work for accumulation models without excessively ridiculous gravitational forces[19] that make little sense, given the energy absorption and discharge rate. A transistor model, which is a natural Scottian electric stellar model derivation, will much more easily account for increasing frequency discoveries, as well as “impossible” phenomena such as repetitive novae and supernovae[20], micronovae[21], and dwarfan flares[22].

Where does this leave the SM/BBC? Dangling against the ropes. When a huge stilt upon which your astrophysical “concrete” theory rests upon abandons one model for clear (albeit apparently embarrassed) admission of a superior and simpler model... that leaves a gaping hole in the “armor” of the SM. One which DM

---

[9] https://etherealmatters.org/sites/default/files/2018-02/Presentation%20SAM%202017.pdf

[10] *“Positron emission or beta plus decay (β^+ decay) is a subtype of radioactive decay called beta decay, in which a proton inside a radionuclide nucleus is converted into a neutron while releasing a positron and an electron neutrino (ν_e). Positron emission is mediated by the weak force.” https://en.wikipedia.org/wiki/Positron_emission*
Conversely it could also be said that since a pulsar is a region where charge (via plasma) is being compressed into an ultra-compact transistor-like plasmoid, which is receiving and quickly discharging more and more protons, that of course it would *appear* to be made of neutrons through electron and positron release… but actually it is made of protons which are throwing out massive amounts of gamma rays. This is, of course, spectrally proven.

[11] https://vimeo.com/212131985

[12] http://iopscience.iop.org/article/10.1088/2041-8205/788/1/L19/pdf

[13] https://www.bas.ac.uk/media-post/a-new-way-to-create-saturns-radiation-belts/

[14] http://www.jstor.org/stable/1700040

[15] So-called “dynamo” mechanisms (a misnomer as well, as dynamos are DC related generators)

[16] Literally gases cannot compress spontaneously in a vacuum without violating thermodynamics.

[17] Literally no charge to attract, according to their model. Conversely, plasma has a reason for a pileup of charge, so-called Marklund Convection: https://youtu.be/sIQRBrmEIXo

[18] https://www.newscientist.com/article/dn8576-fast-spinning-neutron-star-smashes-speed-limit/

[19] https://www.researchgate.net/post/Why_dont_fast_spinning_stars_dont_explode

[20] https://news.sky.com/story/zombie-star-baffles-scientists-by-surviving-supernovae-11119311

[21] https://www.exopolitics.org/impending-solar-flash-event-supported-by-scientific-studies-insider-testimony/

[22] https://www.iflscience.com/space/dwarf-star-emits-solar-flare-10000-times-stronger-anything-seen-our-sun/

failures, SUSY and MOND quasi-quackery (see Table 2), and no amount of BEC's and neutrinos can make up for. Eventually, the resulting question forms on everyone's mind, "Isn't an electric universe and plasma/covert matter model a lot simpler and more coherent?"

Yes.

For more reason why SM cosmologists should consider switching to E/PEMC, see the author's previous works.[23]

Axions are Oxymorons

In the final paper by the ADMX team examined in this part 6 breakdown, a re-hashed "promising" Dark Matter is once again proposed. Axions have fallen out of favor in many sectors, and aren't well understood despite being around since 1977 (see Table 1). They are, after all, rather oxymoronic,

> *"Given that the dark matter density within our own Milky Way halo is expected to be ρa ≈ 0.45 GeV/cm3 [15], dark matter axions would have* ***a local number density*** *~* ***$10^{14}/cm^3$*** *, but would remain almost impossible to detect due to their weak coupling.[24] To date, the most promising detection scheme is the "axion haloscope" which exploits the inverse Primakoff effect [16]. In this scheme, a high-Q, tunable microwave cavity is immersed in a strong magnetic field. Dark matter axions interact with the static magnetic field,* ***convert to photons****, and deposit energy into the resonant mode of the cavity"*[25]

The author has a *number* of problems with the above schemata.

1. That is incredibly difficult to believe density, considering there is zero evidence in our own local matter to justify such an existence. It is really very difficult to believe this is anything more than a mathematical invention - a figment of imagination - not any better than the proposed strings.
2. It doesn't interact because it is 'weak' (undefined), and only proposed to interact if there is a magnetic field 'strong' enough (also undefined). If a black hole, quasar, or AGN isn't strong enough, the author reiterates nothing will be, could be, or ever would be, which makes them not "theoretically detectible" but "practicably invisible forever." It's another unicorn search.
3. If they cannot find them, why postulate that they turn into photons? This is, in the author's opinion, to bolster a presumed connection to the SM. The irony is that, since the photonic model is incomplete or even broken, it will do not good. This is essentially modern sorcery. There isn't enough anima to meet the materia? What is the point of all of this speculation?

The paper goes on to describe a method of using "piezoelectrically tuned multimode cavities" for the detection process. Apparently the Sidecar cryostat is housing an *8.5 T* (wow!) magnet fabricated at Lawrence Livermore National Laboratory[26]. The paper then goes through a detailed description of *how hard it was*, but it finally comes to the point,

> *"Each residual spectrum is then divided by its fit and the baseline of 1 was subtracted to yield unitless spectra with zero mean.* ***Axion-like signals were added to the data*** *to measure the degree of sensitivity degradation caused by the fit." (emphasis added)*[27]

---

[23] [1] & [17]
[24] A plethora of them but can't find a single one. What's worse is, it's local and not some distant object. That should render it much easier to find, right? Wrong. This is why axions have not been favored. They are a mathematical prediction of a physical problem.
[25] https://arxiv.org/pdf/1901.00920.pdf
[26] More irrelevant fiddle-faddle to establish officiality and authority.
[27] p.4

"In summary, the ADMX Sidecar has produced new limits on the axion coupling factor in three frequency bands within the range 4.2 GHz–7.2 GHz. This is the first time an axion haloscope has been operated over much of this region and improves on the solar bounds [42] by two orders of magnitude under the assumption of 100% dark matter axion-like particles. While ***this sensitivity is not sufficient to reach the axion coupling predicted for QCD axions****, it excludes a meaningful $g_{a\gamma\gamma}$ parameter space for generically motivated axions, and spearheads experimental efforts for DFSZ sensitivity in this axion mass range."*

In other words, the equipment can't work, and as stated before likely won't work. They have plans to continue - of course- but it is a fancy paper saying fancily that once again: Dark Matter is nowhere to be found.

Table 1 :: Proper Physics Chronology[28]

Electricity	Ben Franklin	1751
Gaussian Theory	Carl Gauss	1813
Electromagnetism Unification	Michael Faraday	1831
Doppler Redshift	Hippolyte Fizeau	1848
Maxwell's Equations	James Maxwell	1861-62
Quantized Hypothesis	Ludwig Boltzmann	1877
Photoelectric effect	Heinrich Hertz	1887
Electron Theory	JJ Thomson	1897
Quantum Theory	Max Planck	1900
Relativity theory	Henri Poincare	1900-1904
Mass-energy relation	Henri Poincare	1900
Gravity Waves	Henri Poincare	1905
Special Relativity	Albert Einstein	1905
Photoelectric Effect Explained	Albert Einstein	1905
Birkeland Currents	Kristian Birkeland	1908
Atomic Theory Proved	Ernest Rutherford	1911
Particle-Wave Theory of Atoms and Particles	Niels Bohr	1913
General Relativity	Albert Einstein	1915
Proton discovered	Ernest Rutherford	1919
Quantum Radiation Interaction	Paul Dirac	1920
Quantum Mechanics Codified	Born, Heisenberg, Pauli	1924
Bose-Einstein Condensate	Bose, Einstein	1924
Plasma Cosmology	Irving Langmuir	1927
Big Bang Cosmology	Georges Lemaitre	1927
Missing Matter	Edward Zwicky	1933
Magnetohydrodynamics	Hannes Alfven	1940
QEM/QED	Bethe to Feynman	1947-1960
Electroweak Theory	JC Ward	1959
Quarks	M Gell-Mann & G Zweig	1964
Black Hole Theory	John Wheeler	1967
Dark Matter	Rubin & Ford	1970
Electric Star Theory	Ralph Juergens[29]	1972
QCD	Gross, Wilczek, & Politzer	1973
Axions	Peicci & Quinn	1977
SUSY	Werner Nahm	1978
WIMPs	unclear[30]	1980
MOND	Mordehai Milgrom	1982
String Theory	Green & Schwarz	1984
Dark Energy	Friedman[31] or Sivaram[32]	1924 or 1986
M Theory	Edward Witten	1995
Intrinsic Redshift	Halton Arp[33]	1998

[28] Tables 1 and 2 reproduced from [11]; all references in [13] included, as this paper is a follow-up.
[29] https://www.velikovsky.info/Ralph_Juergens
[30] https://www.scientificamerican.com/article/dark-matter-exotic-possibilities/
[31] http://home.fnal.gov/~skent/early.html
[32] https://arxiv.org/ftp/arxiv/papers/0809/0809.3364.pdf
[33] https://www.haltonarp.com/articles/intrinsic_redshifts_in_quasars_and_galaxies.pdf

MACHOs	unclear	2002?[34] [35]

Table 2 :: Falsifications

SUSY	2012[36] - 2017[37]
CDM	2012[38], 2015[39], 2016[40] - 2018[41] [42] [43] [44]
LCDM	2010[45], 2014[46]
WIMPs & MACHOs	2017[47]
MOND	2018[48] [49] [50]
Galaxy Rotation and DM	2017[51] [52]
Standard Redshift	2017[53] [54] [55]
Galaxy Rotation and MOND	2018[56]
Higgs-boson as non-standard Quark	2018[57]
Dark Energy	2018[58]
LDM	2018[59]

Conclusion

The progress made so far in the Dark Matter search has been to confirm the electro-plasma Universe, rather than a non-baryonic Dark Universe. In some of the previous papers, there were mere axiomatic or ideological differences between the topics (such as with BEC's and ultracold plasma). But in most of the searches, clear philosophical divisions have created demonstrable separations which define the difference between a PEMC and BBC/SM vision of reality. In this paper neutrinos and axions were reviewed in new literature which demonstrated their severe constraints. Philosophical and logical conundrums were underlined. Furthermore a neutron-star paper was reviewed and demonstrated to have a strange amount of hubris for being a fantastic reference piece not for the Standard Model, but for alternative Plasma Cosmological models.

[34] http://www.astro.caltech.edu/~george/ay20/eaa-wimps-machos.pdf
[35] https://theconversation.com/from-machos-to-wimps-meet-the-top-five-candidates-for-dark-matter-51516
[36] http://backreaction.blogspot.com/2016/08/the-lhc-nightmare-scenario-has-come-true.html
[37] https://www.space.com/39001-dark-matter-doesnt-exist-study-suggests.html
[38] https://arxiv.org/abs/1204.2546
[39] http://adsabs.harvard.edu/cgi-bin/bib_query?arXiv:1406.4860
[40] http://adsabs.harvard.edu/abs/2016arXiv161003854K
[41] https://arxiv.org/pdf/1808.09823.pdf
[42] https://academic.oup.com/mnras/article/476/3/3124/4875952
[43] https://arxiv.org/pdf/1807.07113.pdf
[44] https://arxiv.org/pdf/1805.04817.pdf
[45] https://arxiv.org/abs/1011.0004
[46] https://astro.uni-bonn.de/~pavel/kroupa_SciLogs.html
[47] https://phys.org/news/2017-12-machos-dead-wimps-no-showsay-simps.html
[48] https://www.physicsforums.com/threads/falsifications-and-constraints-due-to-gw-measurements.929254/
[49] https://arxiv.org/pdf/1804.04167.pdf
[50] https://arxiv.org/ftp/arxiv/papers/1809/1809.09019.pdf
[51] https://arxiv.org/pdf/1805.10706.pdf
[52] https://arxiv.org/pdf/1811.08843.pdf
[53] https://arxiv.org/pdf/1805.03298.pdf
[54] https://arxiv.org/abs/1807.09409
[55] https://arxiv.org/pdf/1804.03888.pdf
[56] https://arxiv.org/pdf/1801.09304.pdf
[57] https://www.nature.com/articles/d41586-018-06130-9
[58] https://arxiv.org/pdf/1810.05027.pdf
[59] https://arxiv.org/pdf/1810.10543.pdf

Some overlap with the SM is demonstrable, but it is established with *apriori* authority that is betrayed by the actual work shown. On all scales: the Universe is, after all, electro-magnetic.

References

1. “Extended Plasma-electromagnetic Cosmology,” Sf. R. Careaga, 2018 http://www.academia.edu/36753648/Extended-Plasma-Electromagnetic_Cosmology_EPEMC
2. “On the Origins of Religions,” Sf. R. Careaga, 2018 http://www.academia.edu/36753645/On_the_Origins_of_Religions
3. “Unboxing Atlantis,” Sf. R. Careaga, 2018 http://www.academia.edu/36753644/Unboxing_Atlantis_A_top-down_review_of_what_we_know_and_dont_know_about_the_Atlantean_through_Megalithic_Period_continents_and_cities_36_000_-2_000_YBP
4. “Our Plasma-Electromagnetic Sky,” Sf. R. Careaga, 2018 http://www.academia.edu/36753643/Our_Plasma-Electromagnetic_Sky_Application_of_Hollow-Expanding-Growing-Electromagnetic_Earth_Hypothesis_with_particular_respect_to_the_Earths_Atmosphere_starting_from_the_Lithosphere_and_ascending_Altitude
5. “Investments in Ragnarok,” Sf. R. Careaga, 2018 http://www.academia.edu/36753646/Investments_in_Ragnarok_Comparisons_and_Conclusions_from_the_study_of_Media_Business_and_Government_investments_in_End_of_the_World_myth_story_and_preparation
6. “Magnetic Universe Theory,” Sf. R. Careaga, 2018 https://www.academia.edu/37439506/Magnetic_Universe_Theory_A_Top-Down_Review_of_Phases_of_Magnetic_Theory_Development_with_accompanying_historiography_and_comparison_with_Unified_Aether_Field_Theories_including_EPEMC
7. “Ferris Wheels and the Dionysian Irony,” Sf. R. Careaga, 2018 http://www.academia.edu/37403915/Ferris_Wheels_and_the_Dionysian_Irony_The_subconscious_drive_of_thrill_abandonment_of_caution_and_the_motifs_of_Amusement_Park_rides
8. “The Predictable Rise of ‘Charged’ Dark Matter,” Sf. R. Careaga, 2018 https://www.researchgate.net/publication/328175179_The_Predictable_Rise_of_Charged_Dark_Matter_How_Covert_MatterHot_Grains-Plasma_in_Dark_Mode-is_pushing_the_failures_of_CDM_and_MOND_into_the_Plasma-Electromagnetic_Cosmological_Paradigm
9. “Clinical Electric Field Measurements,” Sf. R. Careaga, 2018 https://www.researchgate.net/publication/328697566_Clinical_Electric_Field_Measurements_In_situ_pre_and_post_treatment_measurement_data_with_weather_and_space-weather_lunar_and_solar_data_with_self-reported_pain_and_significance_scales_in_three_phases
10. “Chinese Natural Philosophy (Physics) in EPEMC,” Sf. R. Careaga, 2018, http://www.academia.edu/37784032/Chinese_Natural_Philosophy_Physics_in_EPEMC
11. “Bose-Einstein Condensate Cosmology vs PEMC,” Sf. R. Careaga, 2018 https://www.researchgate.net/publication/329427472_Bose-Einstein_Condensate_Cosmology_vs_PEMC_Cold_plasma_Discussing_the_problem_of_replacing_all_forms_of_Dark_Matter_with_an_interstellar_medium_BEC_vs_PEMUAF
12. “Pseudoscience Cannot be Dark Matter,” Sf. R. Careaga, 2018, https://www.researchgate.net/publication/329629284_Pseudoscience_Cannot_Be_Dark_Matter_A_Short_Concise_Rebuttal_to_Negative_Mass_Dark_Photons_and_the_General_Bunkish_Trend_Physics_in_Crisis_Must_be_Guided_to_Safe_Shores
13. “Acoustic Shockwave Cosmology and EPEMC,” Sf. R. Careaga, 2018, https://www.academia.edu/38017260/Acoustic_Shockwave_Cosmology_Big_Bang_and_PEMC_The_belief_in_emergent_matter_versus_material_rearrangement
14. “Plasma Petroglyphs (Plasmaglyphs), Earthworks, and the Megafauna Extinction,” Sf. R. Careaga, 2018, https://www.academia.edu/37490311/Plasma_Petroglyphs_Plasmaglyphs_Earthworks_and_the_Megafauna_Extinction
15. “Charge Distribution Networks as Meridians,” Sf. R. Careaga, 2019, https://www.researchgate.net/publication/330117614_Charge_Distribution_Networks_CDN_as_Meridians_Utilizin

g_conductivity_as_replacement_'structure'_for_meridians_comparison_with_neural_muscular_and_fascial_models
16. “Dark Matter Scatter,” Sf. R. Careaga, 2019, https://www.academia.edu/38105102/The_Dark_Matter_Scatter_How_the_Dark_Universe_Community_is_fraying_and_in_which_directions_as_a_response_to_the_DM_crisis_How_PEMC_re-unifies_the_camps
17. “Ten Reasons to Consider Switching to EPEMC,” Sf. R. Careaga, 2018, https://www.academia.edu/37569958/EPEMC_tm_Benefits_Ten_Reasons_to_Consider_Switching_to_Extended_Plasma-electromagnetic_Cosmology
18. “Bose-Einstein condensate,” Wiki, https://en.wikipedia.org/wiki/Bose%E2%80%93Einstein_condensate
19. “Bose-Einstein condensate in cosmology,” S. Das and R. K. Bhaduri, 2018, https://arxiv.org/pdf/1808.10505.pdf
20. “The Temperatures of Outer Space Around the Earth,” A. Libal, 2018, https://sciencing.com/temperatures-outer-space-around-earth-20254.html
21. “The Matter- Antimatter asymmetry Problem,”https://home.cern/science/physics/matter-antimatter-asymmetry-problem
22. “Did Gravity Save the Universe from 'God Particle' Higgs Boson?”, C. Q. Choi, 2015, https://www.space.com/28181-gravity-higgs-boson-universe-destruction.html
23. “Higgs Boson,” Wiki, https://en.wikipedia.org/wiki/Higgs_boson
24. “States of Matter: Bose-Einstein Condensate,” J. Emspak, 2018, https://www.livescience.com/54667-bose-einstein-condensate.html
25. “Plasma classification (types of plasma)”, https://www.plasma-universe.com/Plasma_classification_(types_of_plasma)
26. “Ultracold neutral plasmas,” T.C. Killian et al., 2007, https://www.sciencedirect.com/science/article/abs/pii/S0370157307001937?via%3Dihub
27. “Trend: Ultracold Neutral Plasmas,” S.L. Rolston, 2008, https://physics.aps.org/articles/v1/2
28. “Charged Planckian Interacting Dark Matter.” M. Garnya, A. Palessandrob et al...2018, https://arxiv.org/pdf/1810.01428.pdf
29. “Nano dust in space and astrophysics,” I. Mann et al…, 2018, https://arxiv.org/pdf/1810.12502.pdf
30. “Measuring the local matter density using Gaia DR2,” A. Widmark, 2018, https://arxiv.org/pdf/1811.07911.pdf
31. “Discovery of a primordial water reservoir in the envelope of HH 211,” O. Dionators, 2018, https://arxiv.org/pdf/1811.08799.pdf
32. “Half the universe’s missing matter has just been finally found,” New Scientist, L. Crane, 2017, https://www.newscientist.com/article/2149742-half-the-universes-missing-matter-has-just-been-finally-found/
33. “Discovery of massive warm-hot circumgalactic medium around NGC 3221,” S Das et al…, 2018 https://arxiv.org/pdf/1810.12454.pdf
34. “Universe has 2 trillion galaxies, astronomers say,” The Guardian, 2016, https://www.theguardian.com/science/2016/oct/13/hubble-telescope-universe-galaxies-astronomy
35. “Y-Type Stars,” Smithsonian Astrophysical Observatory, 2017, https://www.cfa.harvard.edu/news/su201725
36. “Wasp-104B is darker than Charcoal,” T. Mocnik, C. Hellier, and J. Southworth, 2018, https://arxiv.org/pdf/1804.05334.pdf
37. “Origins of Hot Jupiters,” R. Dawson & J. A. Johnson, 2018, https://arxiv.org/abs/1801.06117
38. “Ralph Juergens,” The Velikovsky Encyclopedia, https://www.velikovsky.info/Ralph_Juergens
39. “The Early History of Dark Energy,” http://home.fnal.gov/~skent/early.html
40. “ A Brief History of Dark Energy,” C Sivaram, https://arxiv.org/ftp/arxiv/papers/0809/0809.3364.pdf
41. “Intrinsic Redshifts in Quasars and Galaxies,” H. Arp et al...https://www.haltonarp.com/articles/intrinsic_redshifts_in_quasars_and_galaxies.pdf
42. “WIMPs and MACHOs, Copyright © Nature Publishing Group 2002, K. Griest, http://www.astro.caltech.edu/~george/ay20/eaa-wimps-machos.pdf
43. “Cold Dark Matter and Experimental Searches for WIMPs,” https://www.astro.umd.edu/~ssm/darkmatter/WIMPexperiments.html
44. “From MACHOs to WIMPs: meet the top five candidates for ‘dark matter’,” The Conversation.com, 2015, https://theconversation.com/from-machos-to-wimps-meet-the-top-five-candidates-for-dark-matter-51516
45. S. Hossenfelder, The LHC “nightmare scenario” has come true,” 2016, Available at http://backreaction.blogspot.com/2016/08/the-lhc-nightmare-scenario-has-come-true.html

46. **“**Does Dark Matter Exist? Bold New Study Offers Alternative Model,” Tereza Pultarova, 2017, https://www.space.com/39001-dark-matter-doesnt-exist-study-suggests.html
47. “The dark matter crisis: falsification of the current standard model of cosmology,” P. Kroupa, 2012, https://arxiv.org/abs/1204.2546
48. “Galaxies as simple dynamical systems: observational data disfavor dark matter and stochastic star formation,” Canadian Journal of Physics, vol. 93, P. Kroupa, 2015, http://adsabs.harvard.edu/cgi-bin/bib_query?arXiv:1406.4860
49. “The observed spatial distribution of matter on scales ranging from 100kpc to 1Gpc is inconsistent with the standard dark-matter-based cosmological models, P. Kroupa, 2016, http://adsabs.harvard.edu/abs/2016arXiv161003854K
50. “Problems with The Dark Matter and Dark Energy: Hypothesis and alternative Ideas,” M. L.. Corredoira, 2018, https://arxiv.org/pdf/1808.09823.pdf
51. “Probing dark matter with star clusters: a dark matter core in the ultra-faint dwarf Eridanus II,” Oxford Academic, F. Contenta et al., 2018, https://academic.oup.com/mnras/article/476/3/3124/4875952
52. “Search for annual and diurnal rate modulations in the LUX experiment , D.S. Akerib et al…., 2018, https://arxiv.org/pdf/1807.07113.pdf
53. “Reply to the claim by van Dokkum et al. for a galaxy not containing dark matter .R.Scarpa et al…, 2018, https://arxiv.org/pdf/1805.04817.pdf
54. “Simultaneous Falsification of LCDM and Quintessence with Massive, Distant Clusters,” M.J. Mortonson, 2010, https://arxiv.org/abs/1011.0004
55. “Pavel Kroupa: The Dark Matter Crisis,” P. Kroupa, 2018, https://astro.uni-bonn.de/~pavel/kroupa_SciLogs.html
56. “MACHOs are dead. WIMPs are a no-show. Say hello to SIMPs: New candidate for dark matter,” Phys.org., R. Sanders, 2017, https://phys.org/news/2017-12-machos-dead-wimps-no-showsay-simps.html
57. “Boran et al.,2017 “Falsifications and Constraints due to GW measurements,” Available at https://www.physicsforums.com/threads/falsifications-and-constraints-due-to-gw-measurements.929254/
58. “MOND and the dynamics of NGC-1052-DF2,” B. Famaey et al.., 2018, https://arxiv.org/pdf/1804.04167.pdf
59. “No evidence for modifications of gravity From galaxy Motions on cosmological scales,” J.He et al., https://arxiv.org/ftp/arxiv/papers/1809/1809.09019.pdf
60. “Investigating Dark Matter and MOND Models with Galactic Rotation Curve Data,” M. T. Frandsen and J. Petersen, 2018, https://arxiv.org/pdf/1805.10706.pdf
61. “The distribution of dark matter in galaxies,” P Salucci, https://arxiv.org/pdf/1811.08843.pdf
62. “On the Gaia DR2 distances for Galactic Luminous Blue Variables,” N. Smith et al., 2018, https://arxiv.org/pdf/1805.03298.pdf
63. “Detection of the gravitational redshift in the orbit of the star S2 near the Galactic centre massive black hole,” R. Abuter et al., 2018, https://arxiv.org/abs/1807.09409
64. “EDGES result versus CMB and low-redshift constraints on ionization histories,” S. Witte et al., 2018, https://arxiv.org/pdf/1804.03888.pdf
65. “Spiral Galaxy Rotation Curves Without Dark Matter or MOND – Two Conjectures,” T. Biswas, 2018, https://arxiv.org/pdf/1801.09304.pdf
66. “LHC physicists finally uncover Higgs ‘bottom’ decay,” Nature International Journal of Science, D. Castelvecchi, 2018, https://www.nature.com/articles/d41586-018-06130-9
67. “Cherenkov radiation from the quantum vacuum,” Macleod et al…, 2018 https://arxiv.org/pdf/1810.05027.pdf
68. “Novel direct detection constraints on light dark matter,” T. Bringmann & M. Pospelov, 2018 https://arxiv.org/pdf/1810.10543.pdf
69. C. Harlos & T. Edgell, “We looked at 1,154 climate science results and found no evidence of ‘publication bias,” 2017, Available at https://theconversation.com/we-looked-at-1-154-climate-science-results-and-found-no-evidence-of-publication-bias-84500
70. “Climate Change Research Grants.” US EPA, https://www.epa.gov/research-grants/climate-change-research-grants
71. “Publication bias in climate-change science,” Lund University, https://www.biology.lu.se/research/research-groups/aquatic-ecology/research-projects/publication-bias-in-climate-change-science

72. H. Ludwig, “Your Tax Dollars Fund the ‘Global Warming’ Narrative,” 2017, Available at https://capitalresearch.org/article/your-tax-dollars-fund-the-global-warming-narrative/
73. “Why Exploring Space And Investing In Research Is Non-Negotiable,” Forbes, E. Siegel, 2017, https://www.forbes.com/sites/startswithabang/2017/10/26/even-while-the-world-suffers-investing-in-science-is-non-negotiable/#1800d3dc1647
74. “How much money is spent on space exploration? (Intermediate),” K. Masters, 2015, http://curious.astro.cornell.edu/about-us/150-people-in-astronomy/space-exploration-and-astronauts/general-questions/921-how-much-money-is-spent-on-space-exploration-intermediate
75. “The jets of AGN as giant coaxial cables,’ D. C.Gabuzda, 2017, https://arxiv.org/pdf/1712.08414.pdf
76. “Origin of Enigmatic Galactic-center Filaments Revealed,” Y.-Zadeh, et al. 2004, https://public.nrao.edu/news/origin-of-enigmatic-galactic-center-filaments-revealed/#PRimageSelected
77. “ The Io Dynamo,” NASA, https://www-spof.gsfc.nasa.gov/Education/wio.html
78. “Magnetic Portals Connect Earth to the Sun,” NASA, 2008, https://science.nasa.gov/science-news/science-at-nasa/2008/30oct_ftes
79. “Thin current sheets in space: where the action is,” Swedish Institute of Space Physics, 2012, https://phys.org/news/2012-08-thin-current-sheets-space-action.html
80. “ Current Sheets in the Solar Corona,” The Astrophysical Journal, H. R. Strauss and N. F. Otani, © 1988, http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?1988ApJ...326..418S&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf
81. “Collapse of neutral current sheet and reconnection at micro-scales,” I. F..Shaikhislamov, https://arxiv.org/ftp/arxiv/papers/1711/1711.11284.pdf
82. “Current Sheet Formation in the Interstellar Medium,” E. G Zweibel & A. Brandenburg, The Astrophysical Journal, 1997, http://iopscience.iop.org/article/10.1086/303824/pdf
83. “Freezing-in condition for a magnetic field and current sheets in plasma,” Astrophysics and Space Science, vol. 56, 1978, S. I. Syrovatskii, http://adsabs.harvard.edu/full/1978Ap%26SS..56....3S
84. “Giant galaxy-packed filament revealed,” McGill University, 2012, https://www.sciencedaily.com/releases/2012/05/120517143639.htm
85. “Cosmic filament probes our galaxy's giant black hole,” Harvard-Smithsonian Center for Astrophysics, 2017, https://phys.org/news/2017-12-cosmic-filament-probes-galaxy-giant.html
86. “Giant Dark Matter Bridge Between Galaxy Clusters Discovered,” Space.com C. Moskowitz, 2012, https://www.space.com/16412-dark-matter-filament-galaxy-clusters.html
87. “Solar-radiation burst hit Earth in record time,” K. Young, New Scientist, 2005, https://www.newscientist.com/article/dn7427-solar-radiation-burst-hit-earth-in-record-time/
88. N. Mortillaro, CBC News, 2017 “7 Earth-sized planets found orbiting star 39 light-years away,” Available at https://www.cbc.ca/news/technology/7-earth-like-planets-discovered-1.3992156
89. “How Cold Is a Y Dwarf Star? Even You Are Warmer,” C. Q. Choi, 2011, https://www.space.com/12714-coldest-failed-stars-brown-dwarfs-wise.html
90. “Star smaller than Jupiter discovered,” Space, 2017, http://www.eniscuola.net/en/2017/07/18/star-smaller-jupiter-discovered/
91. “Fast-spinning neutron star smashes speed limit,” New Scientist, M. McKee, 2006, https://www.newscientist.com/article/dn8576-fast-spinning-neutron-star-smashes-speed-limit/
92. “Observations challenge cosmological theories,” University/Bonn, 2018, https://www.uni-bonn.de/news/272-2018
93. “Red face Shift,” Everything Electric, 2015, http://www.everythingselectric.com/red-face-shift/
94. “First observation of gravitational waves,” Wiki, https://en.wikipedia.org/wiki/First_observation_of_gravitational_waves
95. “Gravitational Waves Detected from Neutron-Star Crashes: The Discovery Explained,” C.Q. Choi, 2017, https://www.space.com/38471-gravitational-waves-neutron-star-crashes-discovery-explained.html
96. “Gravitational waves from a binary black hole merger observed by LIGO and Virgo,” LIGO, 2017, https://www.ligo.caltech.edu/news/ligo20170927
97. “Virgo Joins LIGO in Detection of Gravitational Waves,”APS Physics, D. Voss, 2017, https://www.aps.org/publications/apsnews/updates/ligo-virgo.cfm
98. “Stability of disks in quasilinear MOND,” I. Banik et al., 2018, https://arxiv.org/pdf/1808.10545.pdf
99. “Henri Poincaré, Wiki, https://en.wikipedia.org/wiki/Henri_Poincar%C3%A9#Three-body_problem

100. “Hubble data indicate universe growing faster than expected,” Astronomy Now, W. harwood, 2018, https://astronomynow.com/2018/02/23/hubble-data-indicate-universe-growing-faster-than-expected/
101. “We may have Overestimated the Expansion rate of the Universe,” Science, J. Walker, 2015, http://www.digitaljournal.com/science/the-expansion-of-the-universe-may-be-much-slower-than-we-thought/article/430558
102. “Faster Than Light? Neutron-Star Merger Shot Out a Jet with Seemingly Impossible Speed,” Space, M. Wall, 2018, https://www.space.com/41724-neutron-star-merger-superfast-jet.html
103. “The Painlevé-Gullstrand ‘Extension’ - A Black Hole Fallacy,” American Journal of Modern Physics, S. J. Crothers, 2016, http://vixra.org/pdf/1512.0089v1.pdf
104. “Thousands of Black Holes May Lurk at the Galaxy's Center,” Nat Geo, S. Gibbens, 2018, https://news.nationalgeographic.com/2018/04/black-hole-stellar-binary-stars-milky-way-galaxy/
105. “Gravitational Waves Could Collide Sucking Earth Into a Black Hole,” Newsweek, K. Gander, 2018, https://www.newsweek.com/gravitational-waves-could-collide-sucking-earth-black-hole-1097203
106. “ Does Dark Matter Ever Die?” PBS/KET, K. Becker, 2018, http://www.pbs.org/wgbh/nova/next/physics/dynamical-dark-matter/
107. “The frustrating and fascinating world of dark matter research,” ScienceNordic, N. G. Nielsen, 2018, https://phys.org/news/2018-03-frustrating-fascinating-world-dark.html
108. K. Haynes, “What is Dark Matter..., Even the Best Theories are Crumbling,” 2018, Available on http://blogs.discovermagazine.com/crux/2018/09/21/the-dark-matter-crisis/#.W7u0CGhKjct
109. “Yes, The Multiverse Is Real, But It Won’t Fix Physics,” E. Siegel, 2018, https://medium.com/starts-with-a-bang/yes-the-multiverse-is-real-but-it-wont-fix-physics-82beaed322b
110. “Variations Between Dust and Gas In The Diffuse Interstellar Medium 3. Changes In Dust Properties,” W. T. Reach et al., 2018, https://arxiv.org/pdf/1808.03316.pdf
111. “Hall effect-driven formation of gravitationally unstable discs in magnetized molecular cloud cores,” J. Wurster et al., 2018, https://arxiv.org/pdf/1808.04376.pdf
112. “21-cm Fluctuations from Charged Dark Matter,” J. B. Muñoz, 2018, https://arxiv.org/abs/1804.01092
113. “Does Some Dark Matter Carry an Electric Charge?” Harvard Smithsonian CFA, 2018, https://www.cfa.harvard.edu/news/2018-08
114. “On the loadstone and magnetic bodies and on the great magnet the earth. A new physiology, demonstrated with many arguments and experiments,” W. Gilbert, 1893, https://archive.org/details/williamgilbertof00gilb/page/n5
115. “Birkeland current,” Wiki, https://www.plasma-universe.com/Birkeland_current
116. “Perspectives on Plasma,” http://www.plasmas.org/fusion-icf.htm
117. “How to Register a Trademark for a Company Name,” WSJ, http://guides.wsj.com/small-business/starting-a-business/how-to-trademark-a-company-name/
118. Radboud University, Astrophysics, “New theory explains missing Dark energy and Dark matter in our Universe.” J.S. Farnes, 2018, https://www.ru.nl/astrophysics/news-agenda/news/news-ru/new-theory-explains-missing-dark-energy-dark/
119. “On the Gaia DR2 distances for Galactic Luminous Blue Variables ,” N. Smith et al., 2018, https://arxiv.org/pdf/1805.03298.pdf
120. “Intrinsic Redshifts in Quasars and Galaxies.” H.Arp et al., https://www.haltonarp.com/articles/intrinsic_redshifts_in_quasars_and_galaxies.pdf
121. Astronomy and Astrophysics, “Disk stars in the Milky Way detected beyond 25 kpc from its center,” M.L. Corredoira et al., 2018, https://www.aanda.org/articles/aa/abs/2018/04/aa32880-18/aa32880-18.html
122. Astronomy and Astrophysics, ”Measuring the local matter density using Gaia DR2,” A. Widmark, 2018, https://arxiv.org/pdf/1811.07911.pdf
123. Department of Astrophysics, University of Vienna, “Discovery of a primordial water reservoir in the envelope of HH 211,” O. Dionatos, 2018, https://arxiv.org/pdf/1811.08799.pdf
124. Edge.org., “Crisis at the Foundation of Physics,” S. Giddings, https://www.edge.org/response-detail/23857
125. Nature, How the belief in beauty has triggered a crisis in physics,” A. Ananthaswamy, 2018, https://www.nature.com/articles/d41586-018-05374-9
126. Pierre-Marie Robitaille, Articles/Abstracts List, http://vixra.org/author/pierre-marie_robitaille
127. Science & Invention (August 1929) / Psychic Observer 37, "How I Control Gravitation" T.T. Brown, http://blog.lege.net/content/Gravitator_1926.pdf
128. Biefeld-Brown Effect, Wiki, https://en.wikipedia.org/wiki/Biefeld%E2%80%93Brown_effect

129. ScienceDirect, Physics Letter B Volume 787, "Search for dark matter in the form of hidden photons and axion-like particles in the XMASS detector," 2018, https://www.sciencedirect.com/science/article/pii/S0370269318308219?via%3Dihub#fn0030
130. "What is the Mass of a Photon, M. Austern, http://math.ucr.edu/home/baez/physics/ParticleAndNuclear/photon_mass.html
131. "Does Light Have Mass?" P. Gibbs, 1997, http://www.desy.de/user/projects/Physics/Relativity/SR/light_mass.html
132. Darkstar Publications, "Uncovering the missing Secrets of Magnetism," K.L. Wheeler, 2014, https://archive.org/details/magnetism1small/page/n13
133. Quora, "What is Precisely the Speed of Light in Fiber Optics?" https://www.quora.com/What-is-precisely-the-speed-of-light-in-fiber-optics
134. "Intrinsic and extrinsic properties," Wiki, https://en.wikipedia.org/wiki/Intrinsic_and_extrinsic_properties
135. ResearchGate, "Is LIGO guilty of Scientific Fraud? O. E. Rossler, 2015, https://www.researchgate.net/post/Is_LIGO_guilty_of_Scientific_Fraud
136. "The 2017 Nobel Prize for physics was awarded to a FRAUD," D. Chakalov, 2017. http://vixra.org/pdf/1712.0017v1.pdf
137. "Matter Emerges - A Group Project Proposal," W. R. Giordano, 2018, https://www.academia.edu/37980100/Matter_Emerges_-_A_Group_Project_Proposal
138. "Tired Light," Wiki, https://en.wikipedia.org/wiki/Tired_light
139. "Can "tired light theory" explain the observed redshifts of galaxies? (Intermediate) K. Masters, 2015, http://curious.astro.cornell.edu/about-us/110-the-universe/cosmology-and-the-big-bang/alternate-theories/670-can-tired-light-theory-explain-the-observed-redshifts-of-galaxies-intermediate
140. "Errors in Tired Light Cosmology," E.L. Wright, 2008, http://www.astro.ucla.edu/~wright/tiredlit.htm
141. "Tired Light and Type Ia Supernovae Observations," H. Holushko, http://bourabai.kz/articles/snt.pdf
142. "Time Dilation in Type Ia Supernova Spectra at High Redshift," S. Blondin et al., 2008, https://arxiv.org/pdf/0804.3595.pdf
143. "Spiral Galaxy Rotation Curves Without Dark Matter or MOND – Two Conjectures," T. Biswas, 2018, https://arxiv.org/pdf/1801.09304.pdf
144. "The Expanding Universe and Hubble's Law," https://www.physicsoftheuniverse.com/topics_bigbang_expanding.html
145. "Relativistic Jets in Active Galactic Nuclei," R. Blandford , D. Meier , and A. Readhead, https://arxiv.org/pdf/1812.06025.pdf
146. "Michelson–Morley experiment," Wiki, https://simple.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment
147. "Galactic - Scale Electric Fields Could Solve Dark Matter Mystery" 2014, https://medium.com/the-physics-arxiv-blog/galactic-scale-electric-fields-could-solve-the-dark-matter-mystery-says-physicist-117a6488ba0e
148. "A galaxy lacking dark matter," P.V. Dokkum et al., 2018, https://www.nature.com/articles/nature25767
149. "All disk galaxies rotate once every billion years," J. Parks, 2018, http://www.astronomy.com/news/2018/03/all-galaxies-rotate-once-every-billion-years
150. "Birkeland Currents," 2015, http://www.everythingselectric.com/birkeland-currents/
151. "Constraining the charge of the Galactic centre black hole, M.I Zaja˘cek1 et al., 2018, https://arxiv.org/pdf/1812.03574.pdf
152. "Detection of the gravitational redshift in the orbit of the star S2 near the Galactic centre massive black hole," GRAVITY collaboration, 2018, https://arxiv.org/abs/1807.09409
153. "New Simulation Sheds Light on Spiraling Supermassive Black Holes," J. Kazmierczak, 2018, https://www.nasa.gov/feature/goddard/2018/new-simulation-sheds-light-on-spiraling-supermassive-black-holes
154. "Cloudlets Swarm Around our Local Supermassive Black Hole," 2018, https://www.almaobservatory.org/en/audiences/cloudlets-swarm-around-our-local-supermassive-black-hole/
155. "Black Hole 'Donuts' are Actually 'Fountains," 2018, https://alma-telescope.jp/en/news/press/agn-201811
156. "Cosmic Fountain Powered by Giant Black Hole," 2018, http://www.chandra.harvard.edu/photo/2018/a2597/
157. "Measurement of the Electric Current in a kpc Scale Jet," P. P. Kronberg et al., 2011, http://iopscience.iop.org/article/10.1088/2041-8205/741/1/L15/pdf

158. "The jets of AGN as giant coaxial cables," D. C. Gabuzda, M. Nagle and N. Roche, 2017, https://arxiv.org/pdf/1712.08414.pdf
159. "Birkeland Currents: A Force-Free Field-Aligned Model," D.E. Scott, 2015, http://www.ptep-online.com/2015/PP-41-13.PDF
160. "Electric Universe: has there ever been a scientific research program?" http://www.internationalskeptics.com/forums/showthread.php?s=a6a26562dfa9ead7772d677dbad6a74d&t=302933&page=3&styleid=50
161. "Accelerating expansion of the universe," Wiki, https://en.wikipedia.org/wiki/Accelerating_expansion_of_the_universe
162. "Spin Physics," Wiki, https://en.wikipedia.org/wiki/Spin_(physics)
163. "Quantum gas goes below absolute zero, Ultracold atoms pave way for negative-Kelvin materials." Z. Merali, 2013, https://www.nature.com/news/quantum-gas-goes-below-absolute-zero-1.12146
164. Physics Stack Exchange, "What are the calculations for Vacuum Energy?" 2012, https://physics.stackexchange.com/questions/22468/what-are-the-calculations-for-vacuum-energy
165. The Guardian, "Universe recreated in massive computer simulation," I. Sample, 2014, https://www.theguardian.com/science/2014/may/07/universe-recreated-computer-simulation-model-big-bang
166. Science Alert, "Astrophysicists Have Built The Most Detailed Simulation of The Universe Ever Created" M. Mcrae, 2018, https://www.sciencealert.com/most-advanced-illustris-next-generation-computer-model-universe-simulations
167. CERN, (Science), " Dark Matter," https://home.cern/science/physics/dark-matter
168. CERN, (Science), " "The Brout-Englert-Higgs Mechanism," https://home.cern/science/physics/higgs-boson
169. The Guardian News Blog, "Higgs boson announcement: Cern scientists discover subatomic particle," 2012, https://www.theguardian.com/science/blog/2012/jul/04/higgs-boson-discovered-live-coverage-cern
170. NewScientist, " Galaxies in filaments spaced like pearls on a necklace," L. Kruesi, 2014, https://www.newscientist.com/article/dn26598-galaxies-in-filaments-spaced-like-pearls-on-a-necklace/
171. "Galaxies," Prof S. Phillipps, 2009, http://www.star.bris.ac.uk/sxp/galaxiesnotes_short.pdf
172. Nature, "A Vast Thin Plane of Co-rotating Dwarf Galaxies Orbiting the Andromeda Galaxy," R.A. Ibata et al., 2013, https://arxiv.org/abs/1301.0446
173. Ask an Astronomer, "Are the planes of solar systems aligned with the plane of the Galaxy? (Intermediate), C. Springob, 2015, http://curious.astro.cornell.edu/about-us/159-our-solar-system/the-sun/the-solar-system/236-are-the-planes-of-solar-systems-aligned-with-the-plane-of-the-galaxy-intermediate
174. Astronomy, "All disk galaxies rotate once every billion years" J. Parks, 2018, http://www.astronomy.com/news/2018/03/all-galaxies-rotate-once-every-billion-years
175. National Geographic, "This Galaxy Has Almost No Dark Matter—and Scientists Are Baffled," N. Drake, 2018, https://news.nationalgeographic.com/2018/03/dark-matter-galaxy-gravity-dragonfly-physics-space-science/
176. "On the absence of dark matter in dwarf galaxies surrounding the Milky Way," F. Hammer et al., 2018, https://arxiv.org/pdf/1812.10714.pdf
177. New Scientist, "Half the Universe's Missing Matter has Just Been Found," L. Crane, 2017, https://www.newscientist.com/article/2149742-half-the-universes-missing-matter-has-just-been-finally-found/
178. NASA, "Faint Glow Within Galaxy Clusters Illuminates Dark Matter," L.Ramsay and R. Villard, 2018, https://www.nasa.gov/image-feature/goddard/2018/faint-glow-within-galaxy-clusters-illuminates-dark-matter
179. Penn State, "Beyond the Black Hole Singularity," S. Sholtis, 2018, https://news.psu.edu/story/552527/2018/12/20/research/beyond-black-hole-singularity
180. UC Berkeley, "Black holes ruled out as universe's missing dark matter," R. Sanders, 2018, https://news.berkeley.edu/2018/10/02/black-holes-ruled-out-as-universes-missing-dark-matter/
181. ESO, "Most Detailed Observations of Material Orbiting close to a Black Hole," GRAVITY collaboration, https://www.eso.org/public/news/eso1835/
182. ALMA, " Mystery of coronae around supermassive black holes deepens," 2018, https://alma-telescope.jp/en/news/press/blackhole-201812
183. "On the charge of the Galactic centre black hole," M. Zajaˇcek et al., 2018, https://arxiv.org/pdf/1808.07327.pdf

184. "Relativistic Jets in Active Galactic Nuclei," R. Blandford , D. Meier , and A.Readhead 2018, https://arxiv.org/pdf/1812.06025.pdf
185. Oxford Academic, " Dark matter heats up in dwarf galaxies," J. I. Read, M. G.Walker and P. Steger, 2019, https://academic.oup.com/mnras/advance-article/doi/10.1093/mnras/sty3404/5265085
186. Progress in Physics, "Birkeland Currents and Dark Matter," D.E. Scott, 2018, http://www.ptep-online.com/2018/PP-53-01.PDF
187. "Oscillation modes of ultralight BEC dark matter cores," F. S. Guzman, 2019, https://arxiv.org/pdf/1812.11612.pdf
188. AGU100, " Earthquake Lights: Mechanism of Electrical Coupling of Earth's Crust to the Lower Atmosphere," J. Jansky and V. P. Pasko, 2018, https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JD028489
189. AGU100, " Geomagnetically Induced Currents Caused by Interplanetary Shocks With Different Impact Angles and Speeds," D. M. Oliveira, 2018, https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2018SW001880
190. Imperial College London, "Volcanoes fed by 'mush' reservoirs rather than molten magma chambers," H. Dunning, 2018, https://www.imperial.ac.uk/news/189371/volcanoes-mush-reservoirs-rather-than-molten/
191. Science Daily, " New imagery solves mystery of why Mount St. Helens is out of line with other volcanoes," Oregon State University (source,) 2018, https://www.sciencedaily.com/releases/2018/09/180904093838.htm
192. "The Earth's Ring Current: Causes Generation and Decay," D. J. Williams, http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?1983SSRv...34..223W&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf
193. NASA, "NASA Research Reveals Saturn is Losing Its Rings at "Worst-Case-Scenario" Rate," 2018, https://www.nasa.gov/press-release/goddard/2018/ring-rain
194. NASA, "Groundbreaking Science Emerges from Ultra-Close Orbits of Saturn," 2018, https://www.jpl.nasa.gov/news/news.php?feature=7251
195. Phys.org., "The water in Saturn's rings and satellites is like that on Earth except for moon Phoebe, which is out of this world," 2018, https://phys.org/news/2018-12-saturn-satellites-earth-moon-phoebe.html
196. "Inductance Modeling Using New Electromagnetism," R.J. Distini, 2007, http://www.distinti.com/docs/neThesis.pdf
197. "New Constraints on Sterile Neutrino Dark Matter from NuSTAR M31 Observations," K. C. Y. Ng et al., 2019, https://arxiv.org/pdf/1901.01262.pdf
198. "Atmospheric Structure and Radiation Pattern for Neutron-Star Polar Caps Heated By Magnetospheric Return Currents," M.I Baubock, D.S Psaltis , and F. Özel, 2019, https://arxiv.org/pdf/1901.01274.pdf
199. "The Proton-Electron Atom," E. Kaal, 2017, https://etherealmatters.org/sites/default/files/2018-02/Presentation%20SAM%202017.pdf
200. "Positron Emission," Wiki, https://en.wikipedia.org/wiki/Positron_emission
201. The Astrophysical Journal Letters, " Counter-Rotation in Relativistic Magnetohydrodynamic Jets," V. Cayatte et al., 2014, http://iopscience.iop.org/article/10.1088/2041-8205/788/1/L19/pdf
202. British Antarctic Survey (BAS) " A New way To Create Saturn's Radiation Belts," 2018, https://www.bas.ac.uk/media-post/a-new-way-to-create-saturns-radiation-belts/
203. Science Magazine, New Series Volume 238, " The Jupiter-Io Connection: An Alfvén Engine in Space," J.W. Belcher, 1987, https://www.jstor.org/stable/1700040?seq=1#page_scan_tab_contents
204. NewScientist, "Fast-spinning neutron star smashes speed limit," M. McKee, 2006, https://www.newscientist.com/article/dn8576-fast-spinning-neutron-star-smashes-speed-limit/
205. ResearchGate, "Why don't fast spinning stars don't explode? T.D. Mees, https://www.researchgate.net/post/Why_dont_fast_spinning_stars_dont_explode
206. Sky News, "Zombie star' baffles scientists by surviving supernovae," 2017, https://news.sky.com/story/zombie-star-baffles-scientists-by-surviving-supernovae-11119311
207. ExoPolitics.org., " Impending Solar Flash Event Supported by Scientific Studies & Insider Testimony," Dr. M. Salla, 2019, https://www.exopolitics.org/impending-solar-flash-event-supported-by-scientific-studies-insider-testimony/
208. Iflscience.com, "Dwarf Star Emits Solar Flare 10,000 times Stronger than anything seen from Our Sun," https://www.iflscience.com/space/dwarf-star-emits-solar-flare-10000-times-stronger-anything-seen-our-sun/
209. "Piezoelectrically Tuned Multimode Cavity Search for Axion Dark Matter," C. Boutan et al., 2019, https://arxiv.org/pdf/1901.00920.pdf