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May 20, 2023

MDPI Universe

Dear Editors,

Thank you for reviewing our submission to Dr. Remo Ruffini's Festschrift. With this letter, we submit our revised manuscript with changes requested by the reviewers and minor changes we ourselves wished to make. Within the revised manuscript, added or revised text has been highlighted in blue. Minor grammatical changes or corrections remain unmarked. Below we provide a list of relevant changes with the Section denoted:

- Sect. 1 - Revised to discuss the origin of baryon asymmetry and the application of the Sakharov conditions in more detail as recommended by Reviewers #1 and #2.
- Sect. 1.3 - Added references to dynamical or phantom dark energy which are alternatives to the Λ DE model as recommended by Reviewer #2.
- Sect. 3 - Emphasized mesons as a critical participant in antimatter evolution as requested by Reviewer #1.
- Sect. 4 - Section is revised for clarity as well as to emphasize antimatter presence as recommended by Reviewer #1.
- Sect. 5.2 - Emphasis is added that the unique situation of hot dense matter and antimatter in large quantities makes the $e^{\pm}$ epoch uniquely interesting in terms of magnetization as recommended by Reviewer #1.
- Sect. 6 - The photographs honoring Remo Ruffini and Lizhi Fang have been grouped together and moved to the acknowledgements in coordination with editors. The first line of the abstract, as well as the last paragraph of the conclusions have also been moved to acknowledgements with slight revision.

The following figures were changed or modified:

- Fig. 16 - Caption has been expanded to explain all curves.
- Fig. 19 - Figure has been replaced with an corrected value for the Solar core density.
- Fig. 23 - Caption rewritten for clarity.

The following references were added to support above revisions or otherwise support statements already present in the work:

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- S. F. King and C. Luhn, "Neutrino Mass and Mixing with Discrete Symmetry," *Rept. Prog. Phys.*, vol. 76, p. 056201, 2013.
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- B. Abi *et al.*, "Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume II: DUNE Physics." 2 2020.
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- J. Rafelski, M. Formanek, and A. Steinmetz, "Relativistic Dynamics of Point Magnetic Moment," *Eur. Phys. J. C*, vol. 78, no. 1, p. 6, 2018.
- M. Formanek, A. Steinmetz, and J. Rafelski, "Motion of classical charged particles with magnetic moment in external plane-wave electromagnetic fields," *Phys. Rev. A*, vol. 103, no. 5, p. 052218, 2021.
- M. Formanek, A. Steinmetz, and J. Rafelski, "Radiation reaction friction: Resistive material medium," *Phys. Rev. D*, vol. 102, no. 5, p. 056015, 2020.
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The following references were removed:

- Yang, C.T.; Rafelski, J. Bottom quark chemical nonequilibrium in primordial QGP. Update in preparation, **2023**.
- Demiański, M.; Doroshkevich, A.G. Beyond the standard ΛCDM cosmology: the observed structure of DM halos and the shape of the power spectrum, arXiv:astro-ph.CO/1511.07989. **2015**.

The first removed reference (Yang, 2023, in preparation) was a duplicate of another article included in the citations which is on arXiv, and will be submitted for publication once updated. The second (Demiański, 2015) was replaced with a more relevant reference which has been fully published as requested by Reviewer #2. Additionally, a note was added in the bibliography justifying the arXiv reference (Fromerth and Rafelski, 2002) which was published in part in Acta Phys. Polon. B (Fromerth et. al., 2012) and in full in Eur. Phys. J. ST (Rafelski, 2019) as requested by Reviewer #2.

We look forward to having our work accepted for publication.

Sincerely,

Johann Rafelski
Jeremiah Birrell
Andrew Steinmetz
Cheng Tao Yang