

# Algebraic and geometric questions about a FTL physics

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The recent proposal of a negative mass fluid to explain both the dark matter and energy [7] has renovated the interest for cosmological solutions based upon non-ordinary masses. Challenging the  $\Lambda$ -CDM paradigm, some fringe models are grounded on hypothetical interactions with antimatter [5] whereas others suppose the influence of faster than light (FTL) imaginary mass ([4], [6], [8]). More than a decade ago ([1, 2, 3]) we supplied an organic description of all the possible states (positive, negative and imaginary mass) subsequent to modified Lorentz’s equations giving physical significance to the energetic condition  $absE < m_0c^2$ . Namely, we assumed that a fermion could pass from negative energy (identified as antimatter) to positive levels (i.e., the ordinary matter) through the interval between  $-m_0c^2$  and  $+m_0c^2$  where it would behave like a luxon ( $v = c$ ) or a tachyon ( $v > c$ ) keeping its half-integer spin. We wish to illustrate the algebraic and geometric questions behind a so formulated FTL physics, included a falsification test currently being assembled at CERN’s Antiproton Decelerator.

## REFERENCES

- [1] Enzo Bonacci. *Special Relativity Extension*. Turin : Carta e Penna, 2006.
- [2] Enzo Bonacci. *Extension of Einstein’s Relativity*, volume 42 of *Physical Sciences*. Rome : Aracne Editrice, 2007.
- [3] Enzo Bonacci. *Beyond Relativity*, volume 43 of *Physical Sciences*. Rome : Aracne Editrice, 2007.
- [4] Paul Charles William Davies. Tachyonic Dark Matter. *International Journal of Theoretical Physics*, 43(1) : 141–149, 2004.
- [5] Hooman Davoudiasl et al. Unified Origin for Baryonic Visible Matter and Antibaryonic Dark Matter. *Physical Review Letters*, 105(21) : 211304, 2010.
- [6] Robert Ehrlich. Review of the Empirical Evidence for Superluminal Particles and the 3 + 3 Model of the Neutrino Masses. *Advances in Astronomy*, 2019(ID2820492), 2019.
- [7] Jamie Stephen Farnes. A Unifying Theory of Dark Energy and Dark Matter: Negative Masses and Matter Creation within a Modified  $\Lambda$ CDM Framework. *Astronomy & Astrophysics*, 620(A92), 2018.
- [8] Herbert Martin Fried and Yves Gabellini. The birth and death of a universe. *European Physical Journal C*, 76(709), 2016.