Proposed Experiments re Tachyon-Neutrinos
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Abstract

Recent theory of tachyon neutrinos, providing an explanation for Dark Matter, leads to the prediction of an enhanced signal in detection of Cosmic Neutrino Background.

Author’s Note: This paper was submitted to, and promptly rejected by, editors of two prestigious journals and two popular preprint archives. The reasons given were the shortness of the piece and/or the absence of anything new. I have decided to post it as is on my academic website. 11/11/2022
1 Introduction

Recent papers of mine show remarkable theoretical results for the hypothesis that neutrinos are tachyons (faster than light particles) with a mass around 0.1 eV. These papers offer:

* a consistent theory of tachyons [1]
* an explanation for Dark Energy [2]
* an explanation for Dark Matter [3]
* an explanation for the chirality selection rule in weak interactions [4]

Here I want to propose a set of experiments that might verify (or negate) this theory.

2 Ptolemy

This name (for Princeton Tritium Observatory...) is a proposal to detect the Cosmic Neutrino Background (CNB) through the induced beta decay of Tritium: $\nu + T \rightarrow ^3He + e^-$. According to standard cosmological theory, there is a great sea of neutrinos left over from the big bang: their density is $56/cm^3$ (for each type of neutrino) and their temperature is around $1^o K$. It is expected to find a very sharp spike in the emitted electron energies at the endpoint of the usual beta decay spectrum. If the neutrinos are ordinary particles with a small mass, the location of this spike will be slightly beyond the expected end point. If they are tachyons, there is no such displacement.

Ptolemy [5] is expected to be a very difficult experiment: seeing a small effect with a high resolution electron detector. The KATRIN [6] experiment now in progress is not likely to reach the sensitivity needed to see the CNB.

3 My Surprise

My recent paper [3] on Dark Matter proposes that a large portion of the CNB, rather than being dispersed throughout the universe, is condensed about most galaxies. This increased density - by a factor of the order of $10^3$ - provides the extra gravitational field to explain Dark Matter effects in galaxies.

If true, this increase in neutrino density within a galaxy (our galaxy in particular) would make the expected signal in the Ptolemy experiment considerably larger than
originally expected.

But wait, there is more!

My theory separates neutrinos from antineutrinos according to their helicity. The two helicity types behave differently in General Relativity - only one type explains Dark Matter. They also behave differently in beta decay (with lepton number conservation, as in my latest paper [4]). I do not know which way these two markings are connected. So, the Ptolemy experiment with Tritium should either show a big enhancement or no effect at all.

And then one should find an alternative source for Ptolemy - an e⁺ emitter - to see the opposite behavior.

4 Conclusion

This seems like an exciting possibility. I look forward to reactions from other physicists.

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References


