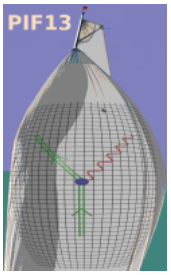

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Birefringence, dichroism and Raman spectroscopy of the vacuum: searching minicharged particles in a high-intensity laser field

Tuesday, 9 July 2013 11:25 (25 minutes)

The quantum vacuum, polarized by a classical electromagnetic field, behaves as an active medium. Its absorptive and dispersive properties are studied in the presence of a high-intensity circularly polarized laser wave. The outcomes of this investigation reveal that, in the region relatively close to the threshold of the two-photon reaction, the birefringence and dichroism of the vacuum can be manifest with lasers of moderate intensities. We take advantage of such properties to impose upper bounds on the parameters associated with hypothetical minicharged particles. In addition, Raman-like electromagnetic waves resulting from a plausible inelastic interaction are suggested as an alternative form for finding exclusion limits on these charge carriers.

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