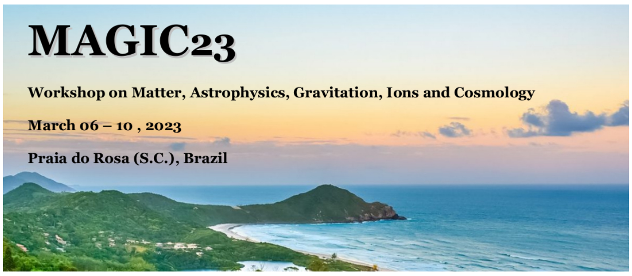

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Radiation pressure of photon propagating in a magnetized vacuum

Using the quadratic expansion in the photon fields of Euler-Heisenberg (EH) non-linear electrodynamics (NLED) Lagrangian model we study relevant vacuum properties in a scenario involving the propagation of a photon probe in the presence of a background constant and static magnetic field, $\mathbf{B_e}$.We compute the gauge invariant, symmetric and conserved energy-momentum tensor (EMT) and the angular momentum tensor (AMT) for arbitrary magnetic field strength using the Hilbert method under the soft-photon approximation. We discuss how the presence of magneto-electric terms in the EH Lagrangian is a source of anisotropy and induce the non-zero trace in the EMT, the latter being connected to the non-conformal anomaly of the non-linear Lagrangian and with the non-conservation of the light cone in Minkowski space-time inducing birefringence. From the EMT we analyze some quantities of interest such as the energy density, pressures, Poynting vector, and angular momentum vector and we compare them with those obtained from the Noether method. The magnetized vacuum properties are also studied showing that a photon-effective magnetic moment can be defined for different polarization modes. The calculations are done in terms of derivatives of the two scalar invariants of electrodynamics hence, extension to other NLED Lagrangian is straightforward.
We discuss further physical implications and experimental strategies to test magnetization, photon pressure, and effective magnetic moment.

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