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Equation of state of photons propagating in magnetized vacuum.

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The photon propagation in a magnetized vacuum is described by non-linear electrodynamics. In this framework, the Energy momentum Tensor is obtained using the robust Euler-Hilbert method that allows getting physical quantities in particular the equation of state. The pressure becomes anisotropic and it is possible to define a pressure perpendicular and parallel to the magnetic field. The calculation is done for arbitrary values of the magnetic field 0<B/Bc<430 applicable for understanding Astrophysical phenomena but also to confirm QED predictions, using top-table experiments with pulsating lasers, or interpreting results as signals of new physics.

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