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## THE ANOMALOUS MAGNETIC MOMENT OF A PHOTON PROPAGATING IN A MAGNETIC FIELD

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**Abstract:**

We analyze the spectrum of the Hamiltonian of a photon propagating in a strong magnetic field  $B \sim B_{cr}$ , where  $B_{cr} = \frac{m^2}{e} \simeq 4.4 \times 10^{13}$  Gauss is the Schwinger critical field.

We show that the expected value of the Hamiltonian of a quantized photon for a perpendicular mode is a concave function of the magnetic field  $B$ . We show by a partially analytic and numerical method that the anomalous magnetic moment of a photon in the one loop approximation is a non-decreasing function of the magnetic field  $B$  in the range  $0 \leq B \leq 30 B_{cr}$ . We provide a numerical representation of the expression for the anomalous magnetic moment in terms of special functions. We find that the anomalous magnetic moment  $\mu_\gamma$  of a photon for  $B = 30 B_{cr}$  is  $8/3$  of the anomalous magnetic moment of a photon for  $B = 1/2 B_{cr}$ .

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