

Magnetic stars as cosmic laboratories for particle physics

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Abstract. We show that magnetic stars can be used as laboratories for research of effects of coupling between photon and pseudoscalar (Goldstone) boson fields. Polarimetric observations of magnetic stars allow determination of the photon-massless boson coupling constant g owing to conversion of a photon into a massless boson in a magnetic field. The measurements of linear and circular polarization of HD 215441 (Babcock star) have been made at the Special Astrophysical Observatory of Russian Academy of Sciences. The best upper limit to the photon-massless pseudoscalar boson coupling constant is given by linear polarimetric observations of this star.