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Searches of ALPs : Galactic Sources

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Even though dark matter constitutes approximately 27% of the Universe, it has been impossible to understand its nature and composition. Historically, the most favored candidate has been the WIMPs (Weakly Interacting Massive Particles), with the Supersymmetric neutralino being the most known candidate. However, it has not been observed any supersymmetric particle. Thus other candidates for dark matter have begun to emerge with more force and renewed interest. One of these is the *Axion like particle*(ALP), a hypothetical light particle (in the range of $\sim \mu$ eVs) arising within theories beyond the standard model (BSM) as an extension of the Axion concept of QCD. The effect of the conversion of ALPs to photons should be observed in the spectrum of highly energetic astronomical gamma-ray sources. In the particular case of galactic sources, the total effect of this coupling is expected as attenuation of their spectrum at energies above several tens of TeVs. Thus, observatories like HAWC have a golden opportunity to explore the properties of ALPs in the range of masses of μeV. This work presents the calculation of the possible effect of the photon-ALP conversion observed as attenuation of the spectrum of eHWC J1908+063 —a high-energy source detected by the HAWC observatory. Limits on two fundamental parameters of this candidate, mass and coupling constant, are established.

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