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Impact of axion decay on the cosmic background

The Cosmic Background (CB) is defined as the isotropic diffuse radiation field with extragalactic origin. Different astrophysical sources dominate the CB emission at different energies, such as stars in the optical or active galactic nuclei in X-rays. Assuming that dark matter consists of axions with masses on the order of electron volts or higher, we expect an additional contribution to the CB due to their decay into two photons. Here, we model the CB between the optical and X-rays regimes, and include the contribution of decaying axions. Through a comparison with the most recent direct and indirect CB measurements, we attempt to constrain the photon-axion coupling parameter space. We also show for which coupling values it is possible to explain the excess in the optical background observed with the LORRI instrument on the New Horizons Probe that does not contradict limits from other optical instruments.

Collaboration / Activity

Axion ALP DM Research Group

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