

Researches on axion-like particles with gamma-ray observations

Wednesday, 27 October 2021 10:10 (20 minutes)

Axion-like particles (ALPs) are hypothetical particles predicted by many extensions of the Standard Model and can also be candidates for dark matter. Many astrophysical phenomena are expected if ALPs exist. At GeV to TeV energies, they could lead to spectral oscillations of distant sources that travel across the external magnetic field. ALPs may also reduce the TeV opacity of the universe, which is caused by the extragalactic-background-light (EBL) absorption of the TeV photons. According to these predicted ALP effects, we search for the existence of ALPs with gamma-ray observations and study their properties. Specifically, we use the Fermi-LAT observation of NGC 1275 to constrain the ALP-photon coupling by considering a regular magnetic field component of the host cluster of NGC 1275. We obtain more stringent constraints than previous works. In our another work, we study how the extragalactic gamma-ray background spectrum will be modulated if ALPs exist and find that in some optimistic cases ALPs can cause great deviation of the EGB spectrum from the prediction of a pure EBL absorption scenario.

Please choose the session this abstract belongs to

Dark matter

Primary author: Mr LIANG, Yun-Feng (Laboratory for Relativistic Astrophysics, Department of Physics, Guangxi University, Nanning 530004, China)

Presenter: Mr LIANG, Yun-Feng (Laboratory for Relativistic Astrophysics, Department of Physics, Guangxi University, Nanning 530004, China)

Session Classification: Session 1