ID de la contribución : **51** Tipo : **Talk**

MeV cosmic-ray electrons modify the TeV pair-beam plasma instability

jueves, 6 de noviembre de 2025 17:30 (15)

Relativistic pair beams formed in the intergalactic medium (IGM) by TeV gamma rays from blazars are expected to generate a detectable electromagnetic cascade in the GeV range. However, this cascade is notably absent in the spectra of many hard-spectrum TeV blazars. One common explanation is that weak intergalactic magnetic fields deflect the resulting electron-positron pairs out of our line of sight. An alternative explanation suggests that electrostatic beam-plasma instabilities deplete the pairs' energy before a cascade can form. While recent studies indicate that scattering by oblique electrostatic modes causes minimal energy loss, these modes may be damped by linear Landau damping (LLD) due to the presence of MeV-scale cosmic-ray electrons in the IGM. In this study, we examine how LLD influences the energy-loss efficiency of plasma instabilities in pair beams from 1ES 0229+200. Our results show that LLD strongly suppresses oblique modes while allowing quasi-parallel modes to grow significantly, thereby boosting the instability's energy-loss efficiency by over an order of magnitude.

Primary author(s) : ALAWASHRA, Mahmoud (DESY)

Co-author(s) : YANG, Yuanyuan (Northeastern University); Prof. HIRATA, Christopher (The Ohio State University); Prof. POHL, Martin (University of Potsdam, DESY)

Presenter(s) : ALAWASHRA, Mahmoud (DESY)

Clasificación de la sesión : Gamma Rays

Clasificación de temáticas : Gamma rays