# Electric current induced by blazar-induced pair beams in homogeneous IGMF

This project aims to estimate the current driven by the blazar-induced pair beams deflecting in homogenous intergalactic magnetic fields. The propagation of those very-high-energy gamma rays from Blazars over cosmological distances has been a topic of extensive theoretical and observational investigations, as it offers a unique probe into the intergalactic medium (IGM).

TeV gamma rays interact with the extragalactic background light (EBL), producing focused beams of electronpositron pairs. These pairs can be deflected by intergalactic magnetic fields (IGMF) suppressing their observed electromagnetic emission by inverse Compton scattering on the cosmic microwave background (CMB) photons.

When the correlation length of the intergalactic magnetic field is larger than the pairs' cooling length. The electrons and positrons go in opposite directions and could induce an electric field in between that drives an electric current in the IGM. The student will use their undergraduate electromagnetic theory knowledge to estimate this current and compare its generated magnetic field with the IGM homogenous one.

# Group

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# **Project Category**

C3. Theory of astroparticle physics

# **Special Qualifications**

Undergraduate electromagnetic theory Basic programming (any language)

# **DESY Site**

Zeuthen

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