Contribution ID: **63** Type: **Contributed Talk**

Angle-dependent and polarization-sensitive synchrotron and SSC blazar model

Wednesday 17 September 2025 14:30 (15 minutes)

Blazars, a subclass of radio-loud active galactic nuclei characterized by relativistic jets directed towards Earth, exhibit strongly linearly polarized emission and two broad, non-thermal spectral energy distributions (SEDs). These features are sensitive to various parameters, including the observer's viewing direction and the magnetic field orientation relative to the jet axis.

This talk presents a polarization-dependent synchrotron and synchrotron self-Compton (SSC) blazar model that accounts for arbitrary magnetic-field orientations and the viewing angle. Using this model, we simulate oblique and toroidal magnetic-field orientations and explore their effects on a generic blazar's SED and linear polarization degree (PD).

We show that the close alignment of the viewing direction and the magnetic field lines suppresses the synchrotron flux level, while leaving the SSC flux almost unaffected. However, both synchrotron and SSC polarization exhibit a pronounced dependence on the field orientation.

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Session Classification: AGN

Track Classification: Active Galactic Nuclei