Contribution ID: **68** Type: **Invited Talk**

High-energy cosmic neutrinos, supermassive black holes, and gravitational lensing

Wednesday 17 September 2025 13:30 (30 minutes)

It is still unclear, where high-energy cosmic neutrinos (detected by IceCube, KM3Net, and other neutrino detectors) originate. Also, it is not clear, which physical processes dominate the emission mechanisms. Blazars seem to play a role but a detailed understanding is still lacking. We find signatures of gravitational lensing in three blazars - all of these three blazars have been reported as likely counterparts of high-energy cosmic neutrinos detected by the IceCube detector. Before, only two cases of strong gravitational lensing of blazar radiation were known. Gravitational lensing explains the extremely fast apparent speeds we discover, the traceable bending of jet structures with time, as well as the rapid flux-density variability of jet features. Although the neutrino-generating process is still not known, lensed blazars might play an important role in furthering our general understanding of the phenomenon.

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Session Classification: AGN

Track Classification: Active Galactic Nuclei