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TELAMON: Constraining the Physics of Very-High-Energy Emission in Blazars through High-Frequency Radio Monitoring

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We present recent results of the TELAMON program, which is using the Effelsberg 100-m telescope to monitor the radio spectra of active galactic nuclei (AGN) under scrutiny in astroparticle physics, namely TeV blazars and neutrino-associated AGN since 2020. The radio variability of these sources and its correlation with high-energy activity are studied based on the first five years of monitoring within our long-term program. Additionally, we derive the polarization properties of candidate neutrino-associated and TeV-emitting blazar jets. Recent studies paint a picture of AGN being tied to ultrahigh-energy cosmic ray and neutrino emission, where the latter might be characteristically associated with radio flares in blazars. Studying the radio emission of these sources can provide crucial information on the high-energy emission processes, complementing multiwavelength studies in other wave bands. In this context the Effelsberg telescope yields superior radio data compared to other monitoring programs in the low flux-density regime due to its large dish aperture and sensitive instrumentation. This is particularly important as TeV-emitting blazars are typically faint radio sources. Our sample includes all known northern TeV-emitting blazars as well as blazars positionally coincident with IceCube neutrino alerts. We recover total intensity as well as polarization information at high radio frequencies up to 44GHz. Additional coordinated and triggered mm-VLBI observations of selected TELAMON sources help to get a more complete understanding of the physical processes in AGN jets that can lead to very-high-energy emission.

Collaboration(s)

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