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Thirty years of blazar studies at the Torino Observatory: from the OJ-94 Project to the Whole Earth Blazar Telescope (WEBT), looking forward to Rubin-LSST

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In 1991 the launch of the Compton Gamma-Ray Observatory (CGRO) satellite renewed interest in blazars, discovering that they can be strong gamma-ray emitters. In 1994 a CCD camera was installed on the 105 cm REOSC telescope of the Torino Observatory, and we began a blazar monitoring program targeting a list of bright gamma-loud sources. We also joined the OJ-94 Project, aiming to confirm the predicted outburst of the alleged periodic blazar OJ 287. The outburst was observed and its double-peak shape followed in detail, leading to a wealth of possible interpretations (e.g. Villata, Raiteri et al. 1998).

In 2000 we took the leadership of the Whole Earth Blazar Telescope (WEBT) Collaboration, which was born in 1997 to provide low-energy observing support to the CGRO observations. From then on, we have been studying blazar multiwavelength variability mainly through the results of massive WEBT observing campaigns, involving many tens of observers, mostly in the optical, but also in the radio and near-infrared bands. The WEBT observations are often complemented by high-energy contemporaneous data to conduct a broad-band analysis of the blazar behaviour. The exceptional sampling of the WEBT light curves allows us to study blazar variability in detail. We have proposed a model according to which the long-term multiwavelength behaviour is explained in terms of variations in the Doppler beaming due to changes of the viewing angle in an inhomogeneous, curved and twisting jet (Raiteri et al. 2017, Nature).

From 2017, the Torino team is involved in the Rubin-LSST Project in the TVS and AGN Science Collaborations. Our main interest is to study blazar variability, census, and environment. We wrote the sessions on blazars of the TVS Roadmap. We also investigated the effects of various LSST observing strategies on blazar studies. This analysis was the subject of a cadence white paper in 2018 and a cadence note in 2021, and led to a paper (Raiteri et al. 2022) for the special issue of the ApJS on the LSST cadence.

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