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Long-term multiwavelength view and broadband modeling of the blazar B2 1811+31

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The intermediate synchrotron-peaked BL Lac B2 1811+31 (z=0.117) underwent a period of high activity from the optical to the very high-energy (VHE; 100 GeV < E < 100 TeV) gamma ray band in 2020. Following a high-state detection by the Large Area Telescope (LAT) on board the Fermi Gamma-ray Space Telescope in the high-energy gamma-ray band (HE; 100 MeV < E < 100 GeV), a dedicated multiwavelength (MWL) campaign was organized. During the course of the campaign, the MAGIC Telescopes detected for the first-time VHE gamma ray emission from the source. To put this high state into the context of the long-term emission of the source, we employed an extensive MWL dataset spanning over 18 years from the radio and optical/UV bands to X rays and HE gamma rays.

In this contribution, we present the long-term MWL behaviour of B2 1811+31, with particular emphasis to the high state. We resolve long-term correlated evolution on timescales ranging from years to weeks in the optical and HE gamma-ray band, as well as variability on timescales of few hours at HE gamma rays during the highest activity period. We observed a significant shift of the synchrotron peak frequency during the flaring activity, which led the source to a borderline state between intermediate and high synchrotron-peaked BL Lac.

We discuss the evolution of the source MWL emission in terms of particle acceleration and cooling within multiple regions active in the jet and propose a self-consistent leptonic model to interpret the broadband emission during the high state.

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