

Modelling the broadband emission from blazars using constraints from multi-messenger and multi-wavelength observations

Based on the origin of the high-energy (X ray to TeV gamma ray) emission from blazars, the models describing their broadband spectral energy distribution (SED) can be broadly classified into three categories - leptonic, hadronic and mixed lepto-hadronic. One of the key advantages of hadronic and lepto-hadronic SED models is their ability to interpret multi-messenger photon and neutrino observations, that is fundamental to identify potential cosmic-ray accelerators. Here we present a new stationary code for modelling the multi-wavelength electromagnetic and neutrino emission from blazars. The code computes the relevant leptonic as well as hadronic emission components thus allowing a self-consistent study of the physical processes at work within the astrophysical engines of blazar jets. The applications of the code are described in terms of the blazar 1ES 1959+650 and the multi-messenger association of the blazar TXS 0506+056 with the high-energy (~290 TeV) neutrino event IC 170922A.

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