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Self-consistent modeling of particle acceleration and evolution of spectral distribution in blazars.

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Blazar emission models are challenged by recent multiwavelength and multi-messenger observations. The only way to transform these observational evidences into an advance of the understanding of the physical phenomena behind, is to build models that are as much as possible reproducible, robust, and with a solidly connection to the phenomenology. I will give some examples of this approach using the JetSeT framework, an open source code able to reproduce radiative and accelerative processes acting in relativistic jets, and to fit the numerical models to observed data. In particular I will review some of the main phenomenological signatures of acceleration acting in the relativistic jets of blazars, and I will show how it is possible to constrain models, linking predictions from Monte Carlo simulations and from the numerical solutions of the diffusion equation in momentum space, to the spectral features observed in the multi-wavelength SED of blazars. I will focus on the spectral evolution and spectral curvature in the X-ray/hard X-ray data and in the TeV data, and the implications on the acceleration mechanisms. Finally, I will discuss the formation of pile-up during strong flares.

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