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On the relation between Compton dominance and jet magnetization in blazars

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Compton dominance, the observed ratio between the high-energy (assumed to be due to inverse Compton) and synchrotron components of the spectral energy distributions of blazars, is an indirect probe of magnetization of their relativistic jets. For most blazars, the Compton dominance is observed in the range 0.3-10, and in the framework of one-zone leptonic models it can be explained by mildly sub-equipartition magnetic fields (Nalewajko & Gupta 2017, A&A 606, A44). However, in the case of extreme BL Lacs, extremely low magnetizations and very high Doppler factors are inferred despite typical values of Compton dominance, mainly due to very inefficient IC scattering in deep Klein-Nishina regime (Tavecchio & Ghisellini 2016; Costamante et al. 2018). It is a mystery why should these blazars, observationally appearing to be a smooth continuation of classic BL Lacs, be powered by very different jets.

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