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Secondary particle yields from photomeson production in BLR radiation fields of blazars

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Gamma-ray and neutrino production in hadronic models of blazars is most commonly initiated by photomeson production of a relativistic hadron component moving as a spatially localized region (emission region; 'blob') with relativistic speed along the blazar's jet axis and interacting with photons of a low energy radiation field in its vicitiny. Target photon fields externally to the emission region, such as the radiation from the broad-line region (BLR) or the omnipresent cosmic microwave background, appear as beamed anisotropic radiation fields in the co-moving frame of the blob.

In this work we use the gyro-phase averaged interaction rate for hadronic proton-photon interactions in such anisotropic target radiation fields and modify the SOPHIA code to calculate the corresponding yields of all secondaries. In particular we present predictions for the neutrino yields from photomeson production in the BLR line radiation field of blazars taking into account its anisotropy in the blob frame.

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