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Modelling Wind Dynamics and Gamma-Ray Emission from LS 5039

Wednesday, 6 July 2022 18:00 (15 minutes)

We present our numerical model for the gamma-ray binary LS 5039, where we utilise a pulsar-wind-driven scenario. In our model the high-energy particle transport is treated jointly with the simulation of the relativistic pulsar wind. Thus, dynamical effects of the turbulent interaction between stellar and pulsar wind can directly translate to the dynamics of the energetic particles. From the resulting distribution function of the energetic particles, we compute their gamma-ray emission as a function of orbital phase and presumed viewing-angle of the system. Our model reproduces observations of the main spectral features of the emission from the system. Where our results deviate from observations, we identify possibly shortcomings of the model. We end with an outlook on related model improvements, showing first-results of new high-resolution simulations of the LS-5039 system.

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