Model of synchrotron spectra of pulsar wind nebula associated with PSR J0437-4715

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An adequate interpretation of the multiwavelength observations of the pulsar wind nebulae (PWNe) requires studying of the relativistic pulsar wind (PW) interaction with the ambient matter. If the pulsar proper velocity relative to the ambient matter is supersonic, the bow shock (BS) and the region containing the converging flows carrying magnetic inhomogeneities occur. In this case the energy-dependent transport can result in significant deformation of the particle energy distribution in the vicinity of the PWN and the BS in comparison with the spectrum of particles accelerated at the PW termination shock. In particular, it can manifest in different observed PWN morphologies in various energy ranges.

In this work the results of stationary test-particle Monte-Carlo modeling for the PW pairs propagation through the system of a PWN with a BS are presented. The results for the particle energy distributions across the system and the evaluated spatial distributions of the synchrotron emission intensity form the modeled source are obtained.

In the presentation a possible interpretation of the multiwavelength observational data for the PWN related to the pulsar J0437-4715 in the framework of the developed model will be discussed.

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