

Pair plasma generation and pulsar gamma-ray emission

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Pulsars are among the most prominent gamma-ray sources observed by Fermi. Despite the wealth of observational information and considerable efforts of theorists we still do not know their exact emission mechanism(s). However, it is widely agreed upon that pulsar activity is intimately connected to the copious generation of electron-positron pairs in pulsar magnetosphere; a rapidly rotating isolated neutron star is active as a pulsar only as long as it can create pairs. The density of this pair plasma certainly affects the emission mechanism(s), wave propagation in the magnetosphere as well as emission properties of PWNe. Here I briefly overview the most recent progress in theoretical studies of pair creation in pulsar magnetospheres and report on the results of pulsar pair cascades modeling based on self-consistent numerical simulations. I discuss the implication of these results for the gamma-ray emission properties of pulsars and possible emission mechanisms responsible for pulsar gamma ray emission.

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