Talk at Splinter Meeting

Splinter E

Simulation of electromagnetic cascades in magnetospheric vacuum gaps near spinning black holes

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Recently, the peculiar radio-galaxy IC 310 has shown extreme flux variations with time-scales of about 5 min at TeV-energies. This is evidence of emission-regions, that are of length-scales below the gravitational radius, and thus cannot be explained via shock-in-jet models.

Alternative models for understanding the origin of gamma-ray emission are magnetospheric models. According to these ones, evacuated regions (vacuum gaps) in active galactic nuclei-magnetospheres are the birthplace of the highest-energetic particles (both ultra-high-energetic cosmic rays and GeV- to TeV-photons). These gaps are expected to be interspersed with both a magnetic field and an electric field, giving rise to strong acceleration of possibly present charged particles.

Electrons, that intrude into the gap, are accelerated to high energies and act as seed particles for the development of an electromagnetic cascade via inverse-Compton-upscattering soft background-photons. By this, high-energy-photons are created, which can again, via interaction with the soft photons, pair-produce new electrons and thus sustain the cascade.

In this talk the numerical simulation of such an electromagnetic cascade as well as resulting particle- and photon-spectra are presented.