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Magnetic Reconnection with Strong Synchrotron Cooling in Pulsar Magnetospheres DMITRI UZDENSKY, CIPS, University of Colorado, ANATOLY SPITKOVSKY, Princeton University — The magnetosphere of a rotating pulsar naturally develops a current sheet beyond the light cylinder (LC). Magnetic reconnection in this current sheet inevitably dissipates a nontrivial fraction of the pulsar spin-down power within a few LC radii. In this presentation, a basic physical picture of reconnection in this environment is developed. It is shown that reconnection proceeds in the plasmoid-dominated regime, via an hierarchical chain of multiple secondary islands/flux ropes. The inter-plasmoid reconnection layers are subject to strong synchrotron cooling, leading to significant plasma compression. The basic parameters of these current layers — temperature, density, and layer thickness — are estimated in terms of the upstream magnetic field. It is argued that, after accounting for the bulk Doppler boosting, the synchrotron and inverse-Compton emission mechanisms can explain the observed pulsed high-energy (GeV) and VHE ($\sim$ 100 GeV) radiation, respectively. The motions of the secondary plasmoids may contribute to the pulsar's radio emission.

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