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Electron-Positron Cascade in Magnetospheres of Spinning Black Holes[1] ALEXANDER L. FORD, KU, BRETT D. KEENAN, LANL, MIKHAIL V. MEDVEDEV, KU, MIT — We quantitatively study the stationary, axisymmetric, force-free magnetospheres of spinning (Kerr) black holes (BHs) and the conditions needed for relativistic jets to be powered by the Blandford-Znajek mechanism. These jets could be from active galactic nuclei, blazars, quasars, micro-quasars, radio active galaxies, and other systems that host Kerr BHs. The structure of the magnetosphere determines how the BH energy is extracted, e.g., via Blandford-Znajek mechanism, which converts the BH rotational energy into Poynting flux. The key assumption is the force-free condition, which requires the presence of plasma with the density being above the Goldreich-Julian density. Unlike neutron stars, which in principle can supply electrons from the surface, BHs cannot supply plasma at all. The plasma must be generated *in situ* via an electron-positron cascade, presumably in the gap region. Here we study varying conditions that provide a sufficient amount of plasma for the Blandford-Znajek mechanism to work effectively. Observational signatures of the system in the X-ray & γ-ray bands are predicted.

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