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Theory of the leptonic cascade in magnetospheres of Kerr black holes[1] MIKHAIL MEDVEDEV, ALEX FORD, BRETT KEENAN, University of Kansas — It is believed that relativistic jets observed in Active Galactic Nuclei, blazars, quasars and micro-quasars, radio-active galaxies and some other systems host rapidly spinning (Kerr) black holes (BH) and are powered by Blandford-Znajek mechanism, which converts the BH rotational energy into Poynting flux. For this process to occur, the BH mays be immersed into the external magnetic field (presumably brought in by the accreting plasma) and plasma must be *created* around a BH (in vacuum, the B-field takes the Ward solution, which delivers zero Blandford-Znajek power). This, plasma production in the so-called "gap" region of the BH magnetosphere is crucial for the jets to exist. Here we present analytical theory of the plasma production via the leptonic cascade. We present conditions (ambient photon spectrum, luminosity, magnetic field strength, BH spin) needed for the cascade multiplicity to exceed unity, i.e., for the astrophysical systems to exhibit powerful jets. We discuss how temporal variations of these parameters can turn the jets off and on.

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