General Relativistic Particle-In-Cell Simulations of Pair Producing Gaps in Black Hole Magnetospheres\textsuperscript{1} YAJIE YUAN, YURAN CHEN, Princeton University — In some low-luminosity accreting supermassive black hole systems, the supply of plasma in the jet funnel region can be a problem. It is believed that a local region with unscreened electric field can exist in the black hole magnetosphere, accelerating particles and producing high energy gamma-rays that can create $e^\pm$ pairs. We carry out time-dependent, self-consistent, 1D general relativistic PIC simulations of this process, including inverse Compton scattering, photon tracking, and $\gamma\gamma$ pair production. We find a highly time-dependent solution where a macroscopic gap opens quasi-periodically to create $e^\pm$ pairs and high energy radiation. We discuss possible implications for sources like M87 and Sgr A*, in particular the variable high energy emission from particles accelerated in the gap.

\textsuperscript{1}YY acknowledges support from the Lyman Spitzer, Jr. Postdoctoral Fellowship awarded by the Department of Astrophysical Sciences at Princeton University. AC acknowledges support from NASA grant NNX15AM30G.

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Date submitted: 03 Jul 2019

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