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Experimental Study of a Pulsating Anode Spot in Helium[1] BENJAMIN YEE, ED BARNAT, Sandia National Laboratories, BRETT SCHEINER, SCOTT BAALRUD, University of Iowa, MATT HOPKINS, Sandia National Laboratories — Anode spots occur when a sufficiently small electrode is biased well above the plasma potential. Under these conditions, electrons are accelerated toward the electrode obtaining adequate energy to ionize the background gas near the face of the electrode. With a large enough bias, a threshold is exceeded causing the ionization region to rapidly expand into a high potential plasma encompassed by a double layer. While this secondary plasma can be stable, it is often observed to possess interesting dynamics. In this work, we examine a pulsating anode spot formed in helium above a solid electrode. Said spot exhibits no stable condition, but instead repeatedly forms and collapses with a frequency on the order of 10 kHz, varying with pressure and electron density. Higher frequency phenomena, on the order of 1 MHz, are also observed during the collapse of the spot. We consider several measurements of the spot properties in order to better understand the physics of its formation and collapse as well as the associated timescales.

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