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Phase-resolved excitation dynamics of a pulsed 13.56 MHz asymmetric surface barrier discharge in atmospheric-pressure argon JAMES DEDRICK, The Australian National University, DEBORAH O'CONNELL, TIMO GANS, University of York, ROD BOSWELL, CHRISTINE CHARLES, The Australian National University, SPACE PLASMA, POWER AND PROPULSION LABORATORY TEAM, YORK PLASMA INSTITUTE TEAM — Atmospheric-pressure discharges with non-thermal ions and electrons are an active topic of international research. This is because the excitation of reactive species, without extensive vacuum systems and significant heat dissipation in the sample, facilitates the surface modification of sensitive materials in a practical and cost-effective way. Asymmetric surface barrier discharges (ASBDs) are a variant of the parallel-plate barrier discharge, whereby the electrodes are offset and the ionisation region is between one electrode and the dielectric, i.e. Propagation occurs over the surface of the insulator with relatively easy access to the sample. Phase-resolved optical emission spectroscopy has been used to study the breakdown behavior of a pulsed 13.56 MHz ASBD in atmospheric-pressure argon. Two directions of observation and the calculation of the electron-impact excitation from the electronic ground state facilitate the study of highly repeatable streamer dynamics and the propagation of distinct ionisation fronts.

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