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Model Study of Breakdown in Low-Pressure Argon between Parabolic Electrodes W.J.M. BROK, E. WAGENAARS, J.J.A.M. VAN DER MULLEN, Eindhoven University of Technology, The Netherlands, M.D. BOWDEN, The Open University, United Kingdom, EPG TEAM — Breakdown between two electrodes in argon at 3.5 Torr is investigated by means of a fluid model and a fluid-particle hybrid model. The cylindrically symmetric electrodes have a parabolic cross section and are placed in a vacuum chamber with their axis aligned and tips separated by 3.3 mm. Experimental observations of visible emission have shown a pre-breakdown light flash near the anode before the applied voltage reached the static breakdown voltage of the setup. After the breakdown voltage had been reached, an ionisation wave was observed to travel from anode to cathode and subsequently to envelope the cathode. The phenomena related to the pre-breakdown flash are investigated with a fluid-particle hybrid model and the results account for the stratified emission near the anode. By modelling this setup with a fluid model, the observed breakdown phenomena can be explained by means of buildup of space charge and the resulting evolution of the electric field.

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