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Langmuir Probe diagnostics of the exhaust plume of a miniature DC-discharge plasma-thruster.

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A U-Shaped plasma-propelled DC-discharge microthruster has been designed by the school of physics and its various properties are under examination. This study examines the quasi-neutral plasma which constitutes the exhaust plume of the Argon-propelled thruster by means of a mobile Langmuir Probe. The probe and its moving mechanism are designed, constructed and controlled as part of the study along with a computerized mechatronic and analytical system which forms part of the probe diagnostics. The study produces various properties of the plume, which include the local ion and electron temperatures, the local plasma potential, the local floating probe potential, The local ion saturation current and the local electron saturation current. Each of these Properties is collected for complete region which constitutes the wake of the thruster. This study will inform future studies of which the purpose will be to optimize the basic design of the microthrusters.

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