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4P01 - Validation of a configurable ion source for testing spaceflight-based thermal plasma measurement instruments

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Governments and corporations around the world have billions of dollars of assets in Low Earth Orbit (LEO). It is, therefore, valuable to analyze the environment, including the thermal ions, in LEO. These thermal ions are critically important to establishing the "ground"potential for all elements of the spacecraft electrical system. Before instruments are launched to make such measurements, they are typically tested, validated, and calibrated in vacuum chambers. We have designed a thermal ion source to emulate the LEO environment and facilitate testing of such instruments. This paper describes the ion source and presents both simulations of its capabilities and empirical test results. Comparing these simulations and test results leads to characterization and understanding of the ion source. With this understanding, we can properly configure the source and better interpret the data from instruments under test.

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