Development and Status of a 100-kW Class Laboratory Nested channel Hall Thruster

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Currently in the United States there is increasing commercial and governmental interest in Hall-effect thrusters for high power applications. Of the Hall-effect thrusters configurations available, it has been observed that Nested channel Hall thrusters (NHT) are well suited to high power applications. The proof of concept work of Liang on the X2 NHT has shown that such a configuration meets or exceeds the performance of conventional single-channel thrusters. In order to extend the NHT concept to higher operating powers with a wider throttling range, the Plasmadynamics and Electric Propulsion Laboratory at the University of Michigan, with the support of the United States Air Force Research Laboratory and NASA, is developing a 100-kW class laboratory-model NHT, the X3. This presentation will cover the heritage of the X3, its unprecedented throttling capabilities, the range of applicable missions, and an initial test plan in the context of serving as a benchmark for future high-power electric propulsion.

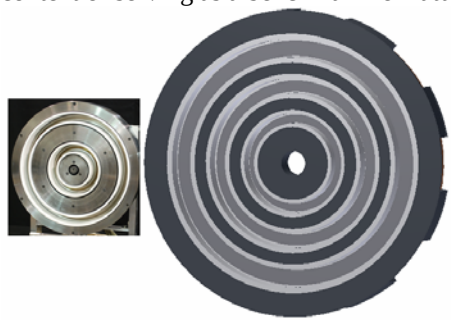

Figure 1. A rendering of the X3 100-kW class NHT (right) beside the X2 NHT (left).

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