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**Effect of anomalous electron cross-field transport on electron energy distribution function in a DC-RF magnetized plasma discharge**[1]
YEVGENY RAITSES, Princeton Plasma Physics Laboratory, VINCENT M. DONNELLY, University of Houston, IGOR D. KAGANOVICH, Princeton Plasma Physics Laboratory, VALERY GODYAK, University of Michigan — The application of the magnetic field in a low pressure plasma can cause a spatial separation of cold and hot electron groups. This so-called magnetic filter effect is not well understood and is the subject of our studies. In this work, we investigate electron energy distribution function in a DC-RF plasma discharge with crossed electric and magnetic field operating at sub-mtorr pressure range of xenon gas [1]. Experimental studies showed that the increase of the magnetic field leads to a more uniform profile of the electron temperature across the magnetic field. This surprising result indicates the importance of anomalous electron transport that causes mixing of hot and cold electrons. High-speed imaging and probe measurements revealed a coherent structure rotating in E cross B direction with frequency of a few kHz. Similar to spoke oscillations reported for Hall thrusters [2], this rotating structure conducts the largest fraction of the cross-field current.

[1] Y. Raitses, J. K. Hendryx, and N. J. Fisch, IEPC-2009-024, in the Proceedings of the 31st International Electric Propulsion Conference, September, 2009, Ann Arbor, MI;
[2] C. L. Ellison, Y. Raitses and N. J. Fisch, Phys. Plasmas 19, 013503 (2012).

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