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Cross-field electron transport through a rotating spoke in Hall thrusters[1] YEVGENY RAITSES, LELAND ELLISON, NATHANIEL J. FISCH, Princeton Plasma Physics Laboratory, Princeton, NJ 08543 — A rotating spoke was observed in cylindrical and annular Hall thrusters [1, 2]. In the cylindrical Hall thrusters with a cusp-shape magnetic field topology, the spoke rotates with a speed of 1-3 km/s in the ExB direction, which is substantially less than the local E×B speed of 30 km/s [2]. In recent experiments, the cross-field electron transport induced by the spoke was directly measured for the first time using a segmented anode. Approximately 50% of the total current is found to pass through the spoke. The cross-field transport mechanism has been explored using emissive and biased electrostatic probes and high speed imaging. The findings reveal a perturbed electric field which enhances electron transport across the field.

[1] G. S. Janes and R. S. Lowder, Phys. Fluids **9**, 1115 (1966)
[2] J. B. Parker, Y. Raitses, and N. J. Fisch, Appl. Phys. Lett. **97**, 091501 (2010).

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