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Cross-field electron transport inside an insulating cylinder of a baffled probe[1] ANDREW ALT, Princeton University, YEVGENY RAITSES, Princeton Plasma Physics Laboratory — Short-circuiting effects in magnetized plasmas by conductive walls, such as the Simon effect [1], have long been observed in laboratory plasmas. In this work, a different short-circuit effect is suggested that is due to bouncing of magnetized electrons off the sheath near confining walls. Experiments have been performed in a magnetized Xe plasma in a cross-field Penning configuration with density ˜10^{12}cm^{-3} and an electron temperature ˜2eV [2]. A cylinder with one open end was placed across field lines so that electrons were blocked from reaching a wire recessed behind the shield while ions were unimpeded. This configuration is relevant to the magnetically insulated baffled probe (MIB), a diagnostic for passively measuring plasma potential [3]. However, the measured electron current was much higher than expected even when the wire was recessed several electron gyroradii behind the baffle. The bouncing motion is suggested as a potential cause for the short-circuiting to the bulk plasma and has been studied with numerical approaches and with separate experiments designed to isolate the effect. This work highlights an effect that may be important for cross-field transport near the walls in a variety of other magnetized plasmas. [1] A. Simon, J. Geophys. Res. 75, 6287 (1970). [2] Raitses, et. al., 34th IEPC, Kobe, Japan (2015). [3] Demidov et. al., Rev. Sci. Instrum. 81 10E129 (2010).

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Andrew Alt
Princeton University

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