Catastrophic global-avalanche of a hollow pressure filament
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Tornado-like transport in a magnetized plasma[1] MATTHEW POULOS, BART VAN COMPERNOLLE, GEORGE MORALES, University of California Los Angeles — Recent heat transport experiments conducted in the LAPD device at UCLA in which avalanche events have been previously documented [1] have also lead to the identification of a new tornado-like transport phenomenon. These tornados occur much earlier than the avalanches events, essentially in the interval following the application of the bias voltage that causes the injection of an electron beam from a ring-shaped LaB6 cathode into the afterglow of a cold, magnetized plasma. The tornados exhibit a low-frequency (4 kHz) (much lower than drift-waves), spiraling, global eigenmode whose transient behavior is responsible for significant radial transport well outside the heated region. Detailed experimental observations are compared with a Braginskii transport code that includes the effects of ExB convection induced by the spiraling global eigenmode. New insights are gained into the necessary modifications of classical transport to accurately simulate the spiraling effects and the possible interaction with avalanches. [1] B. Van Compernolle et al. Phys Rev. E 91, 031102 (2015) Sponsored by DOE/NSF at BaPSF and NSF 1619505.

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