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Dynamics of the current sheet during driven guide-field reconnection OLAF GRULKE, HANNES BOHLIN, DUSAN MILOJEVIC, KIAN RAHBARNIA, ILYA SHESTERIKOV, ADRIAN VON STECHOW, MPI for Plasma Physics — A key issue in the spatiotemporal evolution of magnetic reconnection is the geometry and dynamics of the current sheet, which forms in response to the inductive electric field around the X-point. This paper presents experimental investigations of the current sheet during driven reconnection in the cylindrical experiment VINETA.II. Due to the superimposed homogeneous axial guide magnetic field it is observed that the current sheet thickness varies along the X-line due to magnetic mapping effects. Consequently the reconnection rate is a function of axial position. Within the current sheet electromagnetic fluctuations are observed. The fluctuation amplitude correlates with the local current density and has a similar spatial profile as the current sheet. The fluctuations are incoherent with nearly isotropic correlation lengths on the order of the electron skin depth. Power spectra display a power law decrease with a breaking slope at the lower hybrid frequency.

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