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Kinetic instabilities and reconnection in flux ropes under laboratory and space conditions GIOVANNI LAPENTA, KULeuven, PAOLO PIOVESAN, IGI-CNR, ALEJANDRO ALVAREZ LAGUNA, KULeuven and Von Karman Institut, ELISABETTA BOELLA, STEFAAN POEDTS, KU Leuven — Reconnection converts magnetic energy forming hot flows of matter and Poynting fluxes. Reconnection happens in laboratory either by design (in experiments designed to study it) or as byproduct of other experiments (e.g. sawtooths in tokamaks). Reconnection is also often observed in situ or remotely in space systems. Among the conditions leading to reconnection, the kinking of a flux rope is amongst the most observed: in the solar corona, the Earth magnetosphere and in laboratory plasmas. We consider here specifically two conditions of current interest. First, the conditions expected in the DIIID device where kinking can be induced with appropriare setup [1] and the flux ropes observed by the NASA mission MMS in the Earth magnetopause [2]. In both cases, flux ropes become unstable to a number of competing modes, drift modes and kink modes [3]. We investigate the relative importance and interplay of these two families of modes and their impact on reconnection. Our approach will be taking into account observational data and computer simulation making a direct comparison of the two. [1] DIII-D Frontier Science Campaign, https://tinyurl.com/ya5o9z7m [2] ieroset, M., et al. Geophys. Res. Lett. 43.11 (2016): 5536 [3] Lapenta, G, et al. Nature Physics 11.8 (2015): 690.

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