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On the Role of the Electrostatic Fields in the Evolution of Tearing and Kink Modes GIOVANNI LAPENTA, LANL, GIAN LUCA DELZANNO, LANL, TOM INTRATOR, LANL, IVO FURNO, EPFL — Recent work by the RFX group [1] has uncovered the crucial role played by the electrostatic field in sustaining the dynamo process in RFP devices. The study was conducted by simulation and was based on reaching a quasi-steady state starting from a paramagnetic pinch. The primary contribution of the electrostatic field to sustain the flows responsible for the dynamo processes was observed both in situations dominated by a main mode (quasi-single helicity) and in situation where a rich spectrum of modes is present (multi helicity). We revisit the problem here in a similar but different situation. We consider a single initially straight flux rope similar in configuration and property to the flux ropes created in the RSX device at LANL. We conduct a simulation study of the flux rope evolution and we confirm that the same processes observed in Ref. [1] hold also in the situation considered. Although a large fraction of the field is electromagnetic in nature, as expected for the kinking of a flux rope, the electrostatic field is almost single-handedly responsible for the flow involved in the magnetic reconnection and in the topological changes of the flux surfaces. Such processes are key to the non-linear evolution of the instability.

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