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EUV Measurements and Analytic Models of a Laboratory Solar Coronal Loop Simulation R.J. PERKINS, P.M. BELLAN, Caltech — Solar coronal loops typically erupt abruptly after long quiescent periods. Such eruptions might be initiated by interactions between adjacent loops; this was explored in a laboratory experiment where two plasma-filled flux tubes merge in either a co- or counter-helicity arrangement (J.F. Hansen, S.K.P. Tripathi, and P.M. Bellan, Phys. Plasma 2, 3177(2004)). The latter arrangement produces a bright region with enhanced soft x-ray emission. We investigate such mergings with a new array of EUV photo-detectors (based on S.J. Zweben, R.J. Taylor, Plasma Physics, Vol. 23, No. 4(1981)), and with analytic studies of particle orbits. The EUV array provides spatially and temporally resolved measurements of radiation between 10 and 120 nm needed to observe the bright regions. Precautions are taken against capacitive coupling, incoming plasma, and noise. We model the orbits of individual particles to understand the merging process. These models suggest two classes of trajectories: those confined to a single flux tube and those that move symmetrically between adjacent flux tubes, and how trajectories transition from these classes.

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