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Magnetic Field Reconnection and the quasi-seperatrix layer of three interacting flux ropes[1] WALTER GEKELMAN, BART VAN COMPERNOLLE, STEPHEN VINCENA, UCLA Dept of Physics — Three magnetic flux ropes are created in a background magnetoplasma (L = 16 m, $n_{backgnd} = 2 \times 10^{12} cm^{-3}, n_{rope} = 1 \times 10^{13} cm^{-3}, B_{0z} 330G$, He, plasma diameter = 60 cm). The ropes are made using a masked LaB_6 , 8 cm diameter cathode and remote anode. Each rope carries 40 A of current. Magnetic field data is acquired in 16 perpendicular planes (size $l_x = l_y = 15cm$, 3mm sampling) with axial spacing of 64 cm. The magnetic field lines generated from the data reveal that the flux ropes twist about themselves and each other in a complicated fashion in space and time and there are spatial locations at which transverse magnetic fields of opposite polarity are forced towards each other and reconnect. Fast photography of the light from a He II line shows similar structure. The magnetic field data is used to compute the quasi-seperatrix layer (QSL) much as it was in the case of two interacting flux ropes[1]. The QSL is a 3D region in which reconnection activity is likely to occur. This is shown in movies that illustrate the space-time evolution.

[1] E. Lawrence, W. Gekelman, Identification of a quasi-seperatrix layer in a reconnecting laboratory magnetoplasma, Phys. Rev. Lett., 103, 105002 (2009)

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