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Numerical Studies of Two-Fluid Tearing and Dynamo in a Cylindrical Pinch[1] J.R. KING, C.R. SOVINEC, V.V. MIRNOV, University of Wisconsin - Madison — The nonlinear evolution of two-fluid tearing modes in a cylindrical pinch is investigated with the NIMROD code. The structure and dynamo of single and multi-helicity non-reversed nonlinearly saturated states are examined and compared with single-fluid results. Computations show that the saturated island size and the combined nonlinear Hall and MHD dynamo structure are independent of the ion sound gyroradius, and the Hall dynamo is broad relative to a linear prediction. The individual Hall and MHD dynamo contributions exhibit oscillatory structures away from the rational surface that cancel when the total dynamo is calculated. Mode coupling and modal energy exchange is examined in the multihelicity cases. Consistent with analytical predictions [1], linear results show rotation of the two-fluid tearing instability due to the relatively strong field-line curvature; nonlinear two-fluid rotation is investigated. [1] V.V. Mirnov, et al., Proc. of 21st IAEA Fusion Energy Conf, TH/P3-18 (2006)

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