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MHD stability of extragalactic jets with azimuthal rotation C. CAREY, C. SOVINEC, J. EVERETT, S. HEINZ, University of Wisconsin — Observations of extragalactic jets show highly collimated structures that extend over distances which are many orders of magnitude larger than the central object from which they emanate. Hydrodynamic and magnetohydrodynamic (MHD) launching scenarios have been investigated in various studies [1], but 3D effects have been tractable only relatively recently. An important question for Poynting-flux dominated jets is how they remain robust to kink-type instability. Here, we present nonlinear non-relativistic 3D MHD computations that produce collimated outflows over scales that are significantly larger than the shearing scale of the accretion disk. The calculations indicate that the stability of the column with respect to the kink mode depends on the rotation velocity of the accretion disk relative to the Alfven velocity in the column, similar to the findings of Ref. 2. Above a critical disk velocity, the column is observed to be stable. To confirm threshold rotation rates, we have performed an eigenmode analysis in periodic cylindrical geometry. 1D current profiles that are unstable to m=1 kink modes without flow are found to be linearly stable with rigid rotation at sub-Alfvenic speeds. 1. A. Ferrari, Annu. Rev. Astron. Astrophys. 36, 539 (1998). 2. M. Nakamura and D. L. Meier, ApJ 617, 123 (2004).

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