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Non-axisymmetric Ballooning Modes in Thin Accretion Structures CHRIS CRABTREE, BRUNO COPPI, MIT — The consideration of non-axisymmetric modes in thin accretion structures has been shown to be relevant to the issue of angular momentum transport [1]. To this end we consider the stability of differentially rotating, $u_\phi = R\Omega(R)$, axisymmetric equilibria with cylindrical magnetic flux surfaces to perturbations with large toroidal mode numbers $n_0 \gg 1$. Assuming the equilibrium plasma rotation is approximately Keplerian about a central compact object and the rotation speed is smaller than the thermal speed, the equilibrium pressure and density depend on both R and z. We seek linear solutions to the ideal MHD equations by expanding in the small parameter $1/n_0$ and satisfying requirements similar to those used for ballooning modes in magnetically confined toroidal plasmas: 1) the wavelength parallel to the magnetic field is relatively small, 2) the mode approximately corotates with the plasma, and 3) the compressibility is small but non-zero. Normal mode solutions are constructed using a radially dependent toroidal mode number which is inversely proportional to the rotation frequency such that $k_\phi \sim n_0\Omega_0/u_\phi(R)$ where Ω_0 is a constant. Toroidally periodic perturbations are then constructed with a formalism that is typically used in the theory of ballooning modes in toroidal configurations to enforce periodicity in the poloidal direction in the presence of magnetic shear. [1] B. Coppi, P. Coppi *Ann. Phys.* **291**, 134 (2001) *Supported by U.S. D.O.E.

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