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Stability of zonal flows in finite beta tokamak plasmas[1] PARVEZ GUZDAR, ROBERT KLEVA, IREAP, University of Maryland, College Park, MD — The generation of zonal flow in finite beta plasmas is an active area of research. These flows play a significant role in determining the level of transport caused by the resistive drift-Alfven and drift-ballooning modes which occur in the edge region of tokamak plasmas. Thus understanding the stability of zonal flows can provide key understanding of the transitions triggered in the edge region. We have developed a new eigenvalue code to investigate the stability of zonal flows in finite beta plasmas. The code determines the eigenvalues and eigenmodes associated with all branches of modes present in the given system of equations. We will primarily focus on results for the tokamak edge plasmas where finite beta effects are enhanced by steep pressure gradients and high safety factor q. We will present results of the stability of the zonal flows as a function of the two key dimensionless parameters, the classical ideal ballooning stability parameter and the diamagnetic parameter. The relevance of this study to regulating edge transport will be discussed.

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Parvez Guzdar
IREAP, University of Maryland

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