

Abstract Submitted
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Azimuthal magnetorotational instabilities to non-axisymmetric perturbations¹ YASUHIDE FUKUMOTO, Institute of Mathematics for Industry, Kyushu University, RONG ZOU, Graduate School of Mathematics, Kyushu University — Short-wavelength stability analysis is made of axisymmetric rotating flows of a perfectly conducting fluid subjected to external azimuthal magnetic field, to non-axisymmetric as well as axisymmetric perturbations. The instability caused by the azimuthal magnetic field is referred to as the azimuthal magnetorotational instability (AMRI). We determine the range of unstable angular-velocity distribution and the overall maximum growth rate for the AMRI. Non-axisymmetric perturbations, when coupled to azimuthal magnetic field, widen the instability range of angular-velocity profiles of rotating flows. For strong external field, the maximum growth rate increases, beyond the Oort A-value, without bound in proportion to the strength of the external field. The effect of the electric resistivity is also considered in the limit of very low magnetic Prandtl number.

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