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Instabilities of conducting fluid flows in cylindrical shells under external forcing[1] JAVIER BURGUETE, MONTSERRAT MIRANDA, University of Navarra — Flows created in neutral conducting flows remain one of the less studied topics of fluid dynamics, in spite of their relevance both in fundamental research (dynamo action, turbulence suppression) and applications (continuous casting, aluminium production, biophysics). Here we present the effect of a time-dependent magnetic field parallel to the axis of circular cavities. Due to the Lenz's law, the time-dependent magnetic field generates an azymuthal current, that produces a radial force. This force produces the destabilization of the static fluid layer, and a flow is created. The geommetry of the experimental cell is a disc layer with external diameter smaller than 94 mm, with or without internal hole. The layer is up to 20mm depth, and we use as conducting fluid an In-Ga-Sn alloy. There is no external current applied on the problem, only an external magnetic field. This field evolves harmonically with a frequency up to 10Hz, small enough to not to observe skin depth effects. The magnitude ranges from 0 to 0.1 T. With a threshold of 0.01T a dynamical behaviour is observed, and the main characteristics of this flow have been determined: different temporal resonances and spatial patterns with differents symmetries (squares, hexagonal, triangles,...).

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