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Instability in Electromagnetically Driven Flow between Concentric Spheres[1] SAUL PIEDRA, CONACYT-CIDESI Centro Nacional de Tecnologias Aeronauticas, ALDO FIGUEROA, IVAN RIVERA, CONACYT-Centro de Investigacion en Ciencias, Universidad Autonoma de Estado de Morelos, PHYSICS OF CONTINUOUS MEDIA LABORATORY TEAM — The rotational flow continuously driven by electromagnetic forcing of an electrolytic fluid in the gap of concentric spheres set-up is studied experimentally and theoretically. The driving Lorentz force is generated by the interaction of a DC electric current radially injected and the dipolar magnetic field produced by a permanent magnet. Velocity profiles in the equatorial plane were obtained using Particle Image Velocimetry (PIV), whereas the radial velocity component of the flow was recorded with Ultrasonic Doppler Velocimetry (UDV). A full three-dimensional numerical model that takes into account the dipolar magnetic field and the radial dependency of the applied current was developed. The model reproduces the main features of the electromagnetically forced flow. For small injected currents, a quite axisymmetric equatorial recirculation formed mainly by diffusive momentum transport was found. For currents above 200 mA, which corresponds to a $\mathrm{Re} > 1340$, instabilities of the inner boundary layer are observed and the flow becomes three-dimensional and time dependent.

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