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Tidal instability and magnetic field generation PATRICE LE GAL, DAVID CÉBRON, WIETZE HERREMAN, MICHAEL LE BARS, STÉPHANE LE DIZÈS, IRPHE - CNRS/ Univ. Aix-Marseille, ECOULEMENTS TOURNANTS ET GÉOPHYSIQUES TEAM — We are interested in the interaction of the elliptical instability and magnetic fields in liquid metal flows both on laboratory and planetary scales. We first discuss an experimental set-up that realizes an elliptical flow of Galinstan under an imposed field. The presence of a magnetic field is here of double interest. Elliptically excited flows are monitored through the magnetic fields they induce and the instability may be controlled by Joule damping. This study provides some new insight in the nonlinear stages of the elliptical instability. In a planetary context, it is likely that elliptical instability under imposed field occurs in the tidally deformed moon Io of Jupiter. We show how tidally excited flows may significantly deform the imposed field of Jupiter through an induction process. Finally, we also study whether tidally driven flows can be capable of generating and sustaining magnetic fields through the dynamo effect. We present a first numerical study on the possibility of tidally driven dynamo action in triaxial spheroids.

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