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Experimental results on the magnetorotational instability in helical magnetic fields FRANK STEFANI, THOMAS GUNDRUM, GUNTER GERBETH, Forschungszentrum Dresden-Rossendorf, GÜNTHER RÜDIGER, JACEK SZKLARSKI, Astrophysikalisches Institut Potsdam, RAINER HOLLERBACH, University of Leeds — The magnetorotational instability (MRI) is believed to play a crucial role in the formation of stars and black holes. By destabilizing otherwise stable Keplerian flows, the MRI enables outward transport of angular momentum in accretion discs which is a necessity for the growth of the central objects. Usually, MRI is investigated under the assumption of an externally applied axial magnetic field. However, the effort to investigate the MRI in a liquid metal experiment can be dramatically reduced if the purely axial magnetic field is replaced by a helical magnetic field. We summarize the results of a various Taylor-Couette experiments [1,2,3] with the liquid metallic alloy GaInSn under the influence of helical magnetic fields that show typical features of MRI at Reynolds numbers of the order 1000 and Hartmann nubers of the order 10.
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[2] G. Rüdiger et al. (2006), Astrophys. J. 649 (2006), L145-L147.
[3] F. Stefani et al. (2007), New J. Phys. (2007), in press; astro-ph/0701030.

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