

Abstract Submitted
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Elastorotational instability in Taylor-Couette flow with Keplerian ratio as analog of the Magnetorotational Instability¹ INNOCENT MUTABAZI, YANG BAI, OLIVIER CRUMEYROLLE, LOMC,UMR6294, CNRS-Université du Havre — The analogy between viscoelastic instability in the Taylor-Couette flow and the magnetorotational instability (MRI) has been found by Ogilvie & Potter [1]. It relies on the similarity between the governing equations of viscoelastic flows of constant viscosity (Oldroyd-B model equations) and those of Magneto-hydrodynamics (MHD). We have performed linear stability analysis of the Taylor-Couette flow with a polymer solution obeying the Oldroyd-B model. A diagram of critical states shows the existence of stationary and helicoidal modes depending on the elasticity of the polymer solution. A generalized Rayleigh criterion determines the potentially unstable zone to pure elasticity-driven perturbations. Experimental results yield four type of modes : one pure elasticity mode and three elastorotational modes that are the MRI-analog modes. Anti-Keplerian case has also been investigated. There is a good agreement between experimental and theoretical results [2].

[1] G.I. Ogilvie & A.T. Potter, *Phys. Rev. Lett.* **100**, 074503 (2008).

[2] Y. Bai, O. Crumeyrolle & I. Mutabazi, *Phys. Rev. E.*(2015)

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