

Abstract Submitted
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Linear stability theory of sheared menisci in thin channels BURT TILLEY, Franklin W. Olin College of Engineering, FERDINAND HENDRIKS, Hitachi GST, JOHN BILLINGHAM, University of Nottingham, CHRISTOPHER RAYMOND, NJIT, JOSEPH FEHRIBACH, Worcester Polytechnic Institute, PAUL DELLAR, Imperial College, London — Fluid dynamic bearings (FDB) are rapidly replacing ball bearings for spindles of hard disk drives. Capillary effects are used to keep the lubricant (oil) in the FDB, while viscous effects produce the lubrication pressures needed for contact-free suspension of the rotor in the spindle. We analyse this system in the thin-gap limit, which results in a Couette flow along the flat oil-air interface. A linear stability analysis is performed in the limit of vanishing Reynolds number but where contact-line effects are pertinent. In this limit, two modes are found which are neutrally stable and are independent of the wavenumber of the azimuthally varying disturbance. Extensions from the zero-Reynolds-number limit will also be discussed.

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