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Fingering instability of a suspension film spreading on a spinning disk MAYURESH KULKARNI, SUBHADARSHINEE SAHOO, Chemical Engineering Division, CSIR-National Chemical Laboratory, Pune, India 411008, PANKAJ DOSHI, Pfizer, Inc., Groton, Connecticut, USA, ASHISH ORPE, Chemical Engineering Division, CSIR-National Chemical Laboratory, Pune, India 411008 — We have experimentally investigated the spreading of a suspension drop when rotated atop a spinning disk using flow visualization techniques. The suspension is made of 50 ± 10 micron glass beads suspended in a low viscosity, partially wetting Newtonian liquid having same density as the glass beads. The suspension drop is placed centrally on a horizontal disc and the disc is then rotated at a desired speed. The spreading behavior is captured using a high speed camera and the acquired images are analysed to find the edges of the spreading film. For all the particle volume fractions (ϕ_p) studied, the suspension drops spread radially until they reach a critical radius, following which the contact line develops instabilities which further grow into fingers. The critical radius for the onset of instability shows an increase with increase in the particle fraction (ϕ_p) before decreasing slightly at the highest value of ϕ_p studied, while the instability wavelength (λ) exhibits a non-monotonic dependence. The value of λ is close to that for a partially wetting liquid at lower ϕ_p , it decreases with increasing ϕ_p to a minimum before increasing again at the largest ϕ_p .

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