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Solitary waves running down a vertically falling film: low-dimensional models[1] SYMPHONY CHAKRABORTY, CHRISTIAN RUYER-QUIL, UPMC, Lab. FAST, campus universitaire, 91405 Orsay, France, PHUC KHANH NGUYEN, VASILIS BONTOZOGLOU, Dept. ME, UTh, Volos, 38334, Greece — We consider the wavy regime of vertically falling fluid film. Derivation of LDM for this flow, based on the LW expension have a long history(see review in[1]). A crucial test of such models is the correct prediction of the properties of SW as a function of the distance from the instability threshold. The latter is usually quantified in terms of the reduced Re, $\delta = 3^{\frac{4}{3}} Re^{\frac{11}{9}} Ka^{\frac{-1}{3}}$. Though most models predict similar behavior in the drag-gravity regime($\delta \ll 1$), they exhibit large differences from each other in the drag-inertia regime($\delta \gg 1$). Characteristics of SW solutions to available LDM are shown and contrasted with DNS results. The best agreement with DNS is found with the 4-equation model derived in[2] and the convergence rate of the wave speed to the asymptotic limit c_∞ at $\delta \to \infty$ is affected by viscous diffusion terms and is governed by the Re as $|c - c_\infty| \propto 1/Re^2$. The asymptotic behavior of the speed, amplitude, lengths of the wave-tail and front capillary ripples are discussed. References: [1] R.V.Craster, O.K.Matar. Reviews of modern physics 81 (2009). [2] C.Ruyer-Quil, P.Manneville. Eur.Phys.J. 15 357-369 (2000).

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