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**Laminar circular hydraulic jumps without separation** RATUL DASGUPTA, Jawaharlal Nehru Centre for Advanced Scientific Research, GAURAV TOMAR, University of California at Santa Barbara, RAMA GOVINDARAJAN, Jawaharlal Nehru Centre for Advanced Scientific Research — The traditional inviscid criterion for the occurrence of a planar, standing hydraulic jump is to have the Froude number decrease downstream and go through a value of 1 at some location. Here, upstream propagating, small-amplitude, long, non-dispersive gravity waves are trapped, and non-linear steepening is said to result in a near-discontinuous height profile, but it is not clear how. Such a condition on the Froude number is shown in the present axisymmetric Navier-Stokes computations to hold for a circular jump as well. The relevance of non-linear steepening to a circular jump is therefore a question we wish to answer. In circular jumps, moreover, a region of recirculation is usually observed underneath the jump, underlining the importance of viscosity in this process. This led Tani (J. Phys. Soc. Japan, 1949) to hypothesise that boundary-layer separation was the cause of the circular jump. This hypothesis has been debated extensively and the possibility of circular jumps without separation hinted at. In our simulations, we are able to obtain circular hydraulic jumps without any flow separation. This, and the necessity or otherwise of viscosity in jump formation will be discussed.

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