Abstract Submitted
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Direct Numerical Simulation of Density Currents over Rough Walls KIRAN BHAGANAGAR, XIAOFENG LIU, University of Texas, San Antonio — Direct numerical simulation solver has been developed to simulate density currents over rough walls. The Navier Stokes equations are solved using 4^{th} order vertical velocity equation and a 2^{nd} order vertical vorticity equation. The roughness is introduced using an elegant immersed boundary method (IBM). Spatial discretization is performed using a high order compact finite differences scheme. The time integration is performed using semi-implicit scheme consisting of an explicit 4^{th} order low-storage Runge Kutta scheme for the nonlinear terms and a Crank-Nicolson scheme for the viscous terms. In this talk we will present the fundamental differences in the entrainment due to the presence of 2D and 3D roughness, and we will present an approach to characterize entrainment in terms of the roughness number and Grashoff's number.

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