Numerical simulations of internal tides at a model ridge NAR-SIMHA RAPAKA, BISHAKHDATTA GAYEN, SUTANU SARKAR, University of California San Diego — Direct and large eddy simulations are performed to study tidal flow over a model ridge. The Navier-Stokes equations are solved on a collocated grid using a mixed spectral-finite difference algorithm with a RK3-ADI time integration scheme. The effect of criticality parameter on the tidal conversion is studied in the laminar flow regime and compared with existing inviscid linear theory. Nonlinear processes become important at critical slope of the topography even for low excursion numbers. The effect of turbulence on tidal conversion is assessed under near-critical flow conditions by increasing the barotropic forcing amplitude. Phase dependence of turbulence statistics over a tidal cycle is analyzed at different locations on the ridge. Turbulence near the topography results in up to 25% reduction in the radiated tidal energy.

Narsimha Rapaka
University of California San Diego