Abstract Submitted
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Growth of gravity-capillary waves in countercurrent air/water turbulence[1] ALFREDO SOLDATI, FRANCESCO ZONTA, Dept. of Elec. Manag. and Mechanical Engineering, University of Udine, Italy, MIGUEL ONORATO, Dept. of Physics, University of Torino, Italy — We use Direct Numerical Simulation (DNS) of the Navier Stokes equations to analyze the dynamics of the interface between air and water when both phases are driven by opposite pressure gradients (countercurrent configuration). The Reynolds number (Re_τ), the Weber number (We) and the Froude number (Fr) fully describe the physical problem. We examine the problem of the transient growth of interface waves for different combinations of physical parameters. Keeping Re_τ constant and varying We and Fr, we show that, in the initial stages of the wave generation process, the amplitude of the interface elevation η grows in time as $\eta \propto t^{2/5}$. Wavenumber spectra, $E(k_x)$, of the surface elevation in the capillary range are in good agreement with the prediction of the Wave Turbulence Theory. Finally, the wave-induced modification of the average wind and current velocity profiles will be addressed.

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