

Abstract Submitted
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Anisotropy of symmetric Holmboe waves¹ ADAM JIANKANG YANG, EDMUND TEDFORD, JASON OLSTHOORN, The University of British Columbia, ADRIEN LEFAUVE, University of Cambridge, GREGORY LAWRENCE, The University of British Columbia — Anisotropic fluctuation fields of symmetric Holmboe waves are investigated using single wavelength direct numerical simulations and multiple wavelength direct numerical simulations. The rightward and leftward propagating instabilities are separated with the Fourier transform enabling a direct comparison of the fluctuation fields between the simulations and linear stability analysis. Both the simulations and linear stability analysis show that horizontal and vertical velocity fluctuation pairs tilt towards the 2nd and 4th quadrants, indicating an anisotropic fluctuation field. This anisotropy is explained by tilted elliptical trajectories of particle orbits in Holmboe waves. As a result, a negative correlation between the horizontal and vertical velocity fluctuations is produced, i.e. negative Reynolds stresses on average. The vertical structure of the Reynolds stresses in the simulations and the laboratory experiments agree with the linear stability theory.

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