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Wakes of Self-propelled Bodies in Stratified Fluids[1] S.I. VOROPAYEV, H.J.S. FERNANDO, Arizona State University — Using high Reynolds number (Re=10^4-10^5) experiments, the dynamics of stratified momentum wakes of self-propelled underwater and surface bodies were studied in (i) deep linearly stratified (deep ocean pycnocline), (ii) two layer (shallow pycnocline), and (iii) surface stratified (turbocline) fluids, and theoretical models wee advanced to explain the flow behavior. These models: (i) predict conditions under which submerged wakes signatures penetrate to the water surface, as expressed by the Confinement and Contrast numbers, and (ii) describe IR (infra-red) surface wakes signatures, as expressed by the Contrast and modified Froude numbers. If decaying turbulence is present surrounding the wake, the penetration of wake signature to the surface is still possible. Estimates for typical oceanic cases are given. PIV, LIF and high sensitivity Infrared Imaging cameras were employed for flow diagnostics.

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