Sack Lunch Seminar Series

Ke Li

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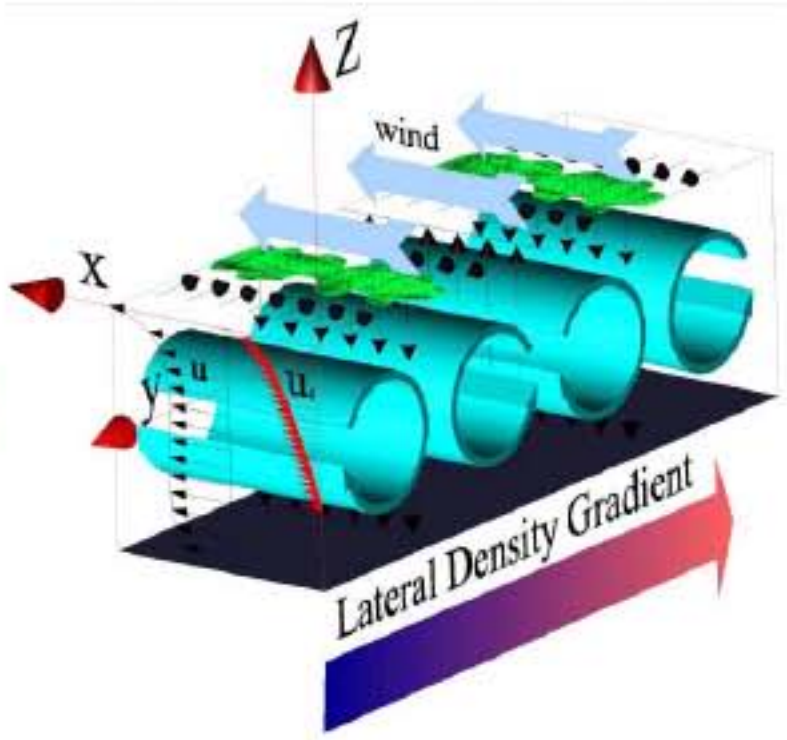
Friday, December 11, 1:00 pm
Room 54-915



Langmuir Circulation in the Presence of Lateral Density Gradients

Comparably little is known about the impact of lateral density gradients (associated with, e.g., submesoscale fronts) on Langmuir circulation in the ocean surface mixed layer. Here, 2D pseudospectral numerical simulations of the laterally stratified Craik-Leibovich equations are performed to elucidate the effect of an imposed horizontal density gradient on Langmuir cells. The simulations show that the downwelling jets between cell pairs become inclined to the vertical and that, in certain parameter regimes, narrow cells (with an aspect-ratio less than unity) are preferred. Linear stability theory is used to corroborate and understand these effects. For certain initial conditions, the fully nonlinear simulations also reveal the onset of a secondary instability and a subsequent energy cascade to fine scales.