Contribution ID: **32** Type: **not specified**

Vortices in Immiscible Mixtures of Bose Einstein Condensates

Friday 16 May 2025 10:15 (30 minutes)

Immiscible superfluid mixtures have been shown to display a wider variety of exotic dynamics than their single component counterparts. Here we consider the mean-field vortex solutions and their stability within a two-component Bose-Einstein condensate in the immiscible limit. We begin by systematically study the dynamics of a binary immiscible Bose-Einstein condensate in two dimensions, where a small bubble of the second component is used to "stir"the first component. We rigorously map out the critical velocity for vortex shedding as a function of the size of the bubble, in analogy to the critical velocity of a laser spoon. Observing that the dynamics of the system depend on the initial size and velocity of the bubble, we then show that a dimensionless parameter with the same form as the Weber number (a dimensionless parameter that characterizes the flow of a multiphase classical fluid) accurately predicts the resulting bubble fragmentation.

Author: DORAN, Ryan (Newcastle University)

Presenter: DORAN, Ryan (Newcastle University)