TITLE OF THE OPEN TALK

"Boundary induced convection in a collection of polar self-propelled particles"

ABSTRACT:

We study a collection of polar self-propelled particles con fined to a long two-dimensional channel. We write the coupled hydrodynamic equations of motion for density and polarisation order parameter. At two con fined boundaries, density is fi xed to the mean and orientation is anti-parallel with fixed magnitude of polarisation. Such boundary conditions make our system similar to a sheared suspension of self-propelled particles, which has many practical applications. Antiparallel alignment at the two con fined boundaries and alignment inside the channel create rolls of orientation along the long axis of the channel. For zero self-propulsion speed, density and orientation fi elds are decoupled and density remains homogeneous inside the channel. For finite self-propelled speed, density inhomogeneities develop and these rolls move along the long axis of the channel. Density inhomogeneity increases sharply with increasing the self-propulsion speed and then reaches a maximum and again decreases for very large speeds. Formation of rolls is very similar to the classic problem of Rayleigh-Benard convection in fluid dynamics.