Numerical and statistical analysis of pure superflow

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The recent developments of new technologies, for the experimental visualization of the normal component profile in helium II by mean of metastable helium molecules[1], have suggested numerical studies for a deeper understanding of the mutual interaction between quantum turbulence and normal component. Here we present our recent numerical studies regarding the mutual interplay between the superfluid vortex points and the flow of the normal component in a 2D He II channel superflow. The channel is characterized by the presence of two slippery walls, parallel to the direction of the flow, for the superfluid component, and a bounded domain for the normal component (i.e the normal flow out of the domain is forbidden)[2]. The further assumption is the presence of many vortex points $N_1 = 1876$ and $N_2 = 4800$ (in counterflow they would mimic the TI and TII status, respectively), whose dynamics is ruled by the lagrangian Schwarz's model[3] and whose number is kept fixed because we are interested to the steady state.
More in detail, we present the distribution of the vorticity of the normal component all over the channel, and the statistical analysis (PDF) for the flow of the normal component and the superfluid flow.

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