

Turbulence and electron bubbles in liquid helium and Bose-Einstein condensates

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Abstract:

Electrons and positive ions – complex entities whose structure is determined by the interactions with helium atoms – have proved to be successful probes of superfluidity of liquid helium. Recently developed technique of ion injection [1] makes it possible to generate tangles of quantized vortex lines with negligible large-scale flow. Explosion of electronic bubbles at negative pressures assists in visualization of vortex lines and leads to formation of novel objects in helium [2]. A single electron in trapped ultracold gases can be used to study interaction processes and explore entanglements in hybrid quantum systems [3]. I will use a mean-field theory to elucidate the dynamics, transport properties and explosion of electron bubbles in superfluids.

References:

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