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Cooper Pairs in a spherical 2D electron system JACQUES TEMPERE, Universiteit Antwerpen, VLADIMIR GLADILIN, Universiteit Antwerpen, ISAAC F. SILVERA, Harvard University, JOZEF T. DEVREESE, Universiteit Antwerpen — We investigate the pairing properties of electrons on a spherical surface. In particular, we consider multielectron bubbles in liquid helium. These are typically micron-sized cavities in helium containing electrons that form a nanometer thin film anchored to the inner surface of the bubble. The bubble is forced open by the Coulomb repulsion between the electrons, balanced by the surface tension of the helium. The electrons in the spherical two-dimensional layer interact with the ripplons, quantized modes of oscillation of the helium bubble surface. This interaction leads to an attractive effective interaction between the electrons, allowing for a Cooper pairing scenario. The paired state is investigated with the Richardson model (more commonly used to study superconductivity in small nanograins). We present results for the ground state properties and the density of states, and highlight differences between the pairing ground state on a spherical surface and that in a bulk (2D or 3D) superconductor.

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