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Effects of surface roughness on non-uniform phases of superfluid ^{3}He and spin-triplet models for Sr_2RuO_4[1] ANTON VORONTSOV, Montana State University, JAMES SAULS, Northwestern University — We present theoretical and computational results for the spectrum of surface bound states of confined superfluid ^{3}He and spin-triplet, odd-parity pairing theories of Sr_2RuO_4. The surface states, despite being related to the topological structure of the condensed state, are sensitive to surface disorder. We investigate effects of surface roughness on the physical properties of the boundary layer of several coherence lengths. We find that for confined ^{3}He-A or chiral phases proposed for Sr_2RuO_4 the spatial profile of the edge current is significantly modified for atomically rough surfaces compared to that for specular surfaces. The boundary effect is strongly reflected in the ground-state angular momentum generated by the edge states. In thin films of superfluid ^{3}He with rough surfaces the effect of surface scattering is expected to be even more important since surface states dominate the thermodynamic properties. For specular boundaries we predicted new phases with spontaneously broken time-reversal or translational symmetries should appear in films of $D \sim 10\xi_0$. We report results for the phase diagram for specular, diffuse and maximal pair-breaking resulting from retro-reflecting boundaries.

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Anton Vorontsov
Montana State University

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