**Controlling the Magnetic Ground State of Cu3Co2SbO6 through Heterostructure Strain Engineering**

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The Kitaev spin liquid is a distinctive form of topological matter in spin systems, characterized by long-range quantum entanglement and the presence of fractional particles [1]. This state arises from magnetic frustration due to anisotropic interactions within a honeycomb structure. Cu3Co2SbO6, which has a Co honeycomb structure, is a promising candidate for realizing the Kitaev spin liquid. However, distortions in the CoO6 octahedra lead to an antiferromagnetic state at low temperatures [2].

In this study, we employed a heterostructure approach to mitigate the distortion of CoO6 octahedra and control the trigonal field. We successfully deposited high-quality, epitaxial Cu3Co2SbO6 using pulsed laser deposition on a SiC substrate and a Cu3Zn2SbO6 buffer layer. High-resolution X-ray diffraction confirmed changes in the lattice constants with varying deposition thicknesses. Additionally, magnetic susceptibility measurements revealed a decrease in the Néel temperature.

These results indicate that applied strain deforms the CoO6 octahedra and suppresses the Heisenberg interaction. This study demonstrates the potential of Co honeycomb materials to realize the Kitaev spin liquid phase and illustrates the effectiveness of heterostructure strain engineering in stabilizing exotic quantum states.

[1] Kitaev, Alexei. "Anyons in an exactly solved model and beyond." Annals of Physics 321.1 (2006): 2-111.

[2] Liu, Huimei, Jiří Chaloupka, and Giniyat Khaliullin. "Kitaev spin liquid in 3 d transition metal compounds." Physical Review Letters 125.4 (2020): 047201.