# High Mobility Free-Standing InSb Nanoflags for Advanced Quantum Technologies

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High-quality III-V narrow band-gap semiconductor materials with strong spin-orbit coupling and large Landé g-factor provide a promising platform for next-generation applications in the field of optoelectronics, spintronics, and quantum computing. Indium antimonide (InSb) offers a narrow band gap, high carrier mobility, and a small effective mass, and thus perfectly fits to this scope. In fact, it has attracted tremendous attention in recent years for the implementation of topological superconducting states supporting Majorana zero modes. However, high quality heteroepitaxial two-dimensional (2D) InSb layers are very difficult to realize owing to the large lattice mismatch with other widespread semiconductor substrates. A solution to this problem is to grow free-standing single-crystalline 2D InSb nanostructures, so-called nanoflags, [1]. In this talk, we present a thorough low-temperature magneto-transport characterization of InSb nanoflag-based Hall-bar and Josephson junction devices. We demonstrate high electron mobility (~29,000 cm2/Vs) and significant supercurrent (~50 nA at 300 mK) [2], which places InSb nanoflags in the spotlight as a versatile and convenient 2D platform for advanced quantum technologies.

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