

Computing with topologically protected states

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In this talk, I will discuss material, transport and device level issues with 2D spin based computing that capitalize on topologically protected states. On 2D surfaces of 3D topological insulators, we show how gate defined PN junctions can be used to collimate spins through Klein tunneling, and then write information efficiently on nanomagnets.

For magnetic films, we show how we can scavenge through the material phase space to stabilize skyrmions and antiskyrmions at room temperature, and through band-engineering that influences their damping and saturation magnetization, design high speed racetrack structures for nonvolatile memory applications.