

THE BATSHEVA DE ROTHSCHILD SEMINAR ON TOPOLOGY MEETS DISORDER AND INTERACTIONS: **PRESENT CHALLENGES, FUTURE PROMISES**  27-31 MAY, 2018

**RAMON INN** MITZPE RAMON

Home | About | Invited Speakers | Venue | Registration | Program | Scientific Committee | Photos

## Large-Spin Magnetic Impurity near a 2D Topological Edge

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2D topological insulators have attracted much attention lately, due to their gapless helical edge modes, which should display maximal charge-spin entanglement and be protected from time-reversal-invariant backscattering at low temperatures. However, significant low-energy backscattering was measured in recent experiments, an observation that has hitherto remained elusive. In this work we study the possible role that may be played by magnetic impurities with spin larger than 1/2, such as the ubiquitous S=5/2Mn in HgTe. For the first time we treat the case of arbitrary isotropy in the impurity-edge exchange, as well as the self-exchange (local anisotropy) of the impurity. We find the latter may strongly enhance backscattering, not only at low temperatures and voltages (where it can exponentially suppress Kondo screening), but also at relatively high energies. The resulting rich behavior of the current-voltage characteristics and noise may allow experiments to reveal the complex internal structure of the magnetic impurities.