Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

RKKY interaction in triangular MoS_2 nanoflakes[1] DIEGO MASTROGIUSEPPE, Instituto de Fisica Rosario, OSCAR AVALOS-OVANDO, SERGIO ULLOA, Ohio University — Transition-metal dichalcogenides (TMDs), such as MoS_2, possess unique electronic and optical properties, making them promising for optospintronics. Exfoliation and CVD growth processes produce nanoflakes of different shapes, often triangular with zigzag edges [1]. Magnetic impurities in this material interact indirectly through the TMD conduction electrons/holes. Using an effective 3-orbital tight-binding model [2], we study the Ruderman-Kittel-Kasuya-Yosida interaction between magnetic impurities in p-doped triangular flakes with zigzag termination. We analyze the interaction as function of impurity separation along high symmetry directions in the nanoflake, considering hybridization to different Mo orbitals, and different fillings. The interaction is anisotropic for impurities in the interior of the flake. However, when impurities lie on the edges of the crystallite, the effective exchange is Ising-like, reflecting the presence of z^2-orbitals associated with edge states. Other interactions are possible by selecting impurity positions and orbital character of the states in their neighborhood. Our results can be tested with local probes, such as spin-polarized STM. [1] A. M. van der Zande et al., Nat. Mat. 12, 554 (2013). [2] G. B. Liu et al., PRB 88, 085433 (2013).

[1]Supported by NSF DMR-1508325

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Date submitted: 05 Nov 2015 Electronic form version 1.4