CHIRAL SPINTRONICS

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Chirality is one of the fundamental asymmetries in nature. Recently chiral nature of specific magnetic structures has been enormous attention and arisen to be very useful for potential application to spintronics since it has been realized that the combination with spin-orbit interaction such as spin Hall effect can be very efficient in manipulation of magnetic elements [1]. In this talk I will present a variety of novel emergent phenomena associated with chiral properties from emergent magnetic nanostructures: spin-orbit torques from perpendicularly magnetized ultrathin films [2], exchange coupling torque [3] and chiral exchange drag [4] from synthetic antiferromagnets, and chiral tunneling from chiral molecules [5]. In the end I will conclude my talk with promising outlooks from these new findings.

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[3] See-Hun Yang, K.-S. Ryu, and S. S. P. Parkin, "Domain-wall velocities of up to 750 m/s driven by exchange-coupling torque in synthetic antiferromagnets", Nature Nanotechnology 10, 221 (2015).

[4] See-Hun Yang, C. Garg, and S. S. P. Parkin, "Chiral Exchange Drag and Chirality Oscillations in synthetic antiferromagnets", Nature Physics (2018) submitted.

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