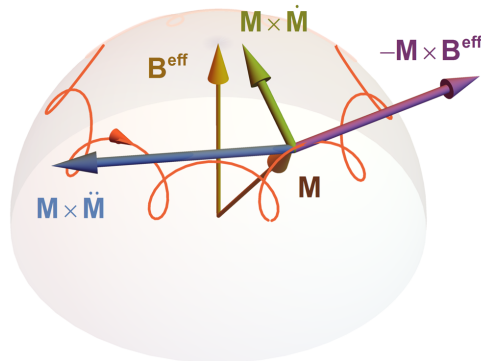


July 27, 2023  
Talk at 15:15  
in P 603  
refreshment afterwards



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### Inertial spin dynamics in ferromagnets and antiferromagnets

Inertial spin dynamics emerges in magnetic materials at very short time scales where the directions of the atomic magnetic moment and angular momentum become separated, and nutation can be observed. The inertia gives rise to additional high-frequency or nutational excitations recently detected in ferromagnetic resonance experiments [1]. Here, the signatures of inertial spin dynamics are discussed theoretically in ferromagnets and antiferromagnets [2]. The nutational spin-wave bands are shifted by a constant frequency compared to the low-frequency bands in ferromagnets, while in antiferromagnets the nutational bands have a maximum in the center of the Brillouin zone [3]. It is demonstrated that a resonant excitation of the nutation may be utilised for switching the order parameter [4]. The switching is found to proceed faster in antiferromagnets than in ferromagnets, and in antiferromagnets tuning the excitation frequency can be used to control the direction of the switching.

[1] K. Neeraj et al., Nat. Phys. 17, 245 (2021).

[2] R. Mondal, S. Großenbach, L. Rózsa, and U. Nowak, Phys. Rev. B 103, 104404 (2021).

[3] R. Mondal and L. Rózsa, Phys. Rev. B 106, 134422 (2022).

[4] L. Winter, S. Großenbach, U. Nowak, and L. Rózsa, Phys. Rev. B 106, 214403 (2022).

