Centre de Nanosciences & de Nanotechnologies

Seminar

Friday November 25th - 10h00

Amphithéâtre du C2N

"Magnonics in collinear and canted antiferromagnets: From Spin-Pumping to Magnon-Photon Coupling"

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Recent years have been the frame of a renewal of activity of magnonic and spintronic research on antiferromagnetic materials due to some of their intrinsic and potentially advantageous properties . Their vanishing stray fields, higher resonance frequencies, and the possibility to control them by spin currents renders them scalable, fast and tunable for future ICT devices. However, the implementation of magnonic AFM devices requires a profound understanding of the spin dynamics of AFMs and of their ability to couple to other systems to be integrable with other platforms. Despite huge progress, the capacity to generate coherent and sizeable electrical signal from their magnetization dynamics, and to couple efficiently with photonic excitation in cavities remain mainly elusive.
In my presentation, I will first report on our latest results on the investigation of inverse spin Hall effects generated by AFM resonances using hematite Fe_2O_3 and chromium oxide Cr_2O_3 as model systems . I will in parallel discuss on their dynamics can strongly couple with cavity photon and form AFM cavity magnon polaritons. I will evidence that the presence of DMI in the canted phase of Hematite leads to an enhanced spin pumping signal as well as an increase of the magnon-cavity photon coupling strength compared to the collinear phase, achieving cooperativities C>70 for the canted phase. These results pave the way to integrate canted AFMs in future AFM magnonic devices and for information processing with cavity magnonics.

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