Spinwave Brillouin spectroscopy with frequency combs and broadband electrical detection

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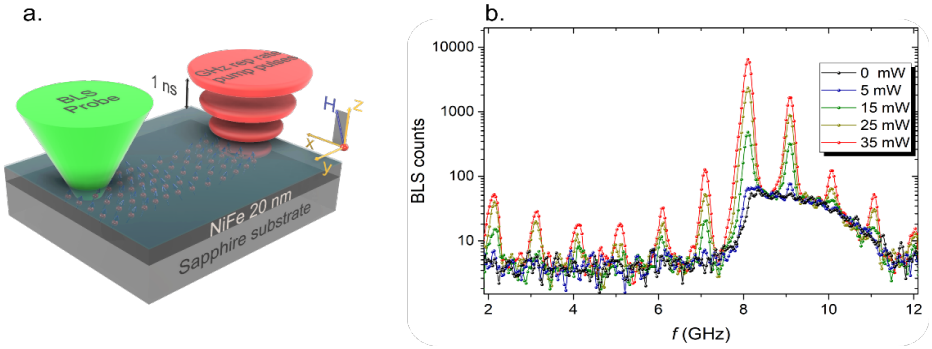
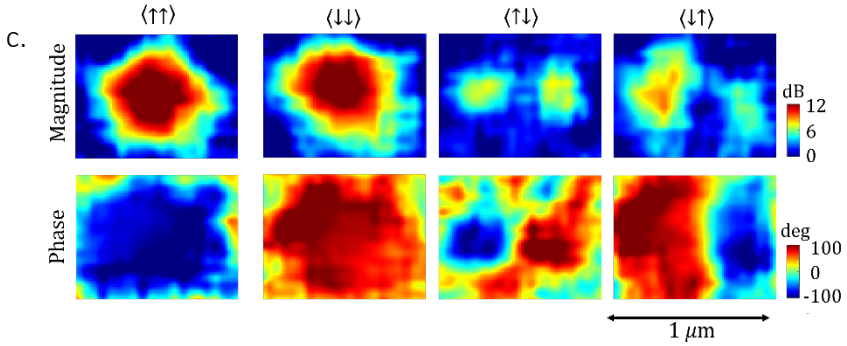
Brillouin light scattering has evolved into a powerful and versatile method to study the acoustic and magnetic phenomena down to the nanoscale. In addition, the advent of ultrafast laser technology has raised an interest in studies of light-matter interaction under such extreme conditions.

In this talk I will present my work developing a method called ultrafast pumped Brillouin microscopy, which allows selective laser generation of highly localized spinwave and acoustic combs. Additionally, to overcome most of the difficulties of bulky Brillouin spectrometers and long acquisition times, I will present our recent advances in broadband electrical imaging of spin-Hall nano-oscillators (SHNO) using novel Frequency comb Magnetooptical Kerr effect microscopy (FR-MOKE).



a. Pump-probe experimental shceme of a 20 nm NiFe film. / b. FMR Brillouin spectrum at 5 diffenret pump powers.



c. One micron mapping using FR-MOKE microscopy of the magnitude and phase of a system of two SHNOs in its four posible phase binary states.

17.11.2023 at 09:00

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