# CESQ Colloquium

## Tuesday May 6 @ 3 PM

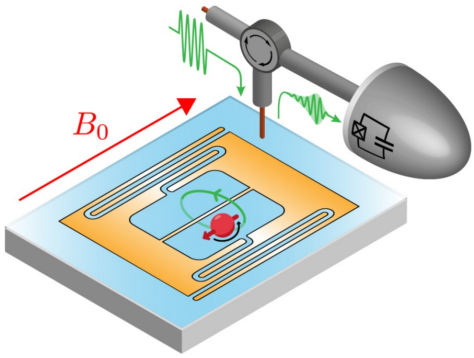
**Seminar Room, Centre Européen de Sciences Quantiques, Campus de Cronenbourg**

# Daniel Estève

**Service de Physique de l'Etat Condensé, CEA Saclay**

## *Ultimate Magnetic Resonance*

Electron Paramagnetic Resonance provides a powerful method for finely analysing matter by measuring the response of electron spins placed in a magnetic field to microwave excitation. However, this technique requires the use of a large number of spins, with around $10^{15}$ spins per Hz of resonance frequency in a spectrometer operated at room temperature. By measuring at very low temperature the response of electron spins strongly coupled to microwave nano-resonators using quantum amplifiers with the lowest possible noise, the Quantronics group has recently achieved a sensitivity of 10 spins/Hz. With a new magnetic resonance method based on the detection of the single fluorescence microwave photon produced by a single electron spin during its relaxation process, magnetic resonance on a single electron spin has been demonstrated. Magnetic resonance experiments on a single nuclear spin coupled to such an electron spin have been demonstrated subsequently. I will describe these advances in ultra-sensitive detection of magnetic resonance and the prospects they open up.

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