



## SEMINAIRE ISMO

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### **Resonant energy transfer and dipolar interactions in collisions of NH<sub>3</sub> with Rydberg He atoms**

Rydberg states of atoms and molecules can possess large electric-dipole transition moments, and large static electric dipole moments. They can therefore be exploited to study resonant energy transfer, and effects of long-range electrostatic dipole-dipole interactions in collisions with polar ground-state molecules.

The results of experiments will be presented in which both of these electric dipole-dipole interaction mechanisms have been studied, and controlled using electric fields, in collisions of helium atoms in triplet Rydberg states with ammonia molecules in their ground electronic state. This work was performed in an apparatus in which a pulsed supersonic beam of metastable helium was crossed with an effusive beam of ammonia. Resonant energy transfer was detected by state-selective electric field ionization of the Rydberg atoms, while the effects of electrostatic dipole-dipole interactions were identified by microwave Ramsey interferometry.

The future extension of this work to incorporate chip-based decelerators for the preparation of cold, velocity-controlled beams of Rydberg atoms, will allow studies of chemical dynamics in which long-range dipolar interactions can be exploited to regulate access to short-range Penning ionization processes at low energy, and will also be discussed.

**Le séminaire  
sera donné  
en Anglais**

**Mardi 25 avril 2017 à 11h**

**Bât. 210 – Amphi 1 (2<sup>ème</sup> étage)**

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