



# Soutenance de thèse

Vendredi 27 octobre 2017

14h

C2N, Site d'Orsay, Bâtiment 220 91405 Orsay

Salle 44 (P. Grivet)

## Yuting LIU

« Electric field control of domain wall dynamics »

### Composition du jury proposé

M. Henk J.M. Swagten, TU Eindhoven, Rapporteur

M. Rolf Allenspach, IBM research Laboratory, Zurich, Rapporteur

M. Vincent Jeudy, LPS Orsay, Examineur

Mme. Hélène BÉA, SPINTEC Grenoble, Examinatrice

Mme Anne Benard-Mantel, Institut Néel Grenoble, Examinatrice

M. Gianfranco Durin, Istituto Nazionale di Ricerca Metrologica, Turin, Examineur

M. Dafiné Ravelosona, C2N Orsay, Directeur de thèse, invité

Melle Liza Herrera-Diez, C2N-Orsay, Co-directrice de thèse, invitée

### Résumé

Electric (E) field control of magnetism in ferromagnetic thin films has attracted great attention as a promising feature that could reduce the energy consumption of novel spin- tronic devices. In particular, electrical control of magnetic anisotropy, and therefore magnetic domain wall (DW) dynamics, is intensively studied in view of applications in low-power electrical magnetization switching.

In this work, I will show a device design based on ionic liquid gating of CoFeB/MgO/HfO<sub>2</sub> thin films that allows for an E-field controlled reorientation of the anisotropy easy axis of up to 90°. Ionic liquid gating is the key to the large anisotropy modulation that these devices can provide. This strong E-field effect was employed to achieve voltage control of magnetic domain wall velocity, pinning and domain nucleation in liquid gated magneto- electric devices.