Réunions scientifiques

Séminaires

Séminaire SOLEIL

Giant Rashba Effects on Semiconducting Substrates

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Grand Amphi SOLEIL

The degeneracy of electronic states of opposite spins is lifted at surfaces or interfaces due to the lack of inversion symmetry and to the out-of-plane gradient of the crystal potential. The splitting can be further enhanced by a strong in-plane potential gradient in a surface alloy **[1]**. Although the emerging field of spintronics is based on the exploitation of spin-orbit effects on semiconductors, the above results were obtained on metallic surfaces or interfaces.
We will explore two novel semiconductor-based systems with spin-orbit parameters of the same order of magnitude as in the metallic surface alloys. In the trilayer Si(111)-Ag-Bi system, the alloy was formed on a ultrathin silver film which is itself deposited on a clean Si(111) surface. By adjusting the thickness of the Ag buffer layer we report a strong interaction of its quantum well states and the spin-split electronic states of the alloy. Angle-resolved photoemission spectroscopy (ARPES) and first-principles calculations evidence the formation of spin-dependent gaps whose number and energy positions can be tuned making possible the tailoring of the electronic structure near the Fermi energy **[2]**. Secondly, the Si(111)-Bi trimer phase is examined by a combination of ARPES and different theoretical approaches. Interestingly, its peculiar band topology and the enhanced spin-orbit parameters can be captured by an empirical tight-binding model **[3, 4]**.

References:

[1] C.R. Ast et al., Phys. Rev. Lett. **98**, 186607 (2007).
[2] E. Frantzeskakis et al., Phys. Rev. Lett. **101**, 196805 (2008).
[3] I Gierz et al., Phys. Rev. Lett. **103**, 046803 (2009).
[4] E. Frantzeskakis et al., arXiv 1006.3566 (2010).

Ce séminaire sera suivi d'une pause-café

Formalités d'entrée *: accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).*

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