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Electronic control inside a molecule : towards single molecule devices MATHIEU LASTAPIS, YURIE FUKUMA, JOHN BOLAND, CRANN, Trinity College, Dublin — The chimerical single molecule engineering has been proven to be accessible through the use of scanning tunnelling microscopy (STM) [1]. In this field, one particularly attractive area is the study of single molecules adsorbed on semiconductor surfaces. It has been recently demonstrated that a spatial fine control of the molecular dynamics is possible through the use of tunnelling current [2]. In order to improve the electronic control of a single molecule, we are currently investigating a promising system: CaF2 on Si(111). This system has been extensively studied as a model system to deposit insulator on silicon. Here we are using this system to electronically decouple the molecule from the substrate. I will present LT STM experiments on atomically thick CaF islands on Si(111). The measured electronic properties of these islands demonstrate their potential as ideal templates to study single molecules. Finally I will present some preliminary results on N-HBC [3] adsorbed on a CaF island.

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[2] M. Lastapis et al, Science, 308, 1000 (2005)
[3] S.Draper et al, JACS, 126, 8694 (2004)

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