Post-doctoral position

Ferroelectric control of conductivity in β-Ga_2O_3 for power electronics

Ga_2O_3 belongs to the family of ultra-wide band gap semiconductors with potentially unrivalled performance thanks to record breakdown fields. It has become a potentially key material with performances outdoing SiC and GaN for power electronics applications following massive improvement in single crystal quality and thin film growth techniques.

The project will study the insertion of a ferroelectric $HfZrO_2$ (HZO) layer in a metal/Ga_2O_3/semiconductor transistor stack to provide functional control of the Ga_2O_3 conductivity. The robust nature of the polarization means that the Ga_2O_3 conductivity can be switched by a simple voltage pulse, thus reducing leakage and making such a device suitable for low energy consumption, power switch applications. HZO is immediately Si-compatible and ideal for use in microelectronics.

Ferroelectric domains will be written into the HZO films and characterized using piezo-response force microscopy. The post-doctoral researcher will use of several advanced photoemission-based techniques to explore the chemistry and electronic structure of HZO/Ga_2O_3 interfaces, including synchrotron radiation induced Hard X-ray photoelectron spectroscopy, Photoemission electron microscopy and laboratory based X-ray photoelectron spectroscopy. The work will be carried out in the framework of a collaboration between the CEA Saclay and the Air Force Research Laboratory (Dayton, OH, USA) who will supply the samples.

The initial contract is for 12 months, renewable 12 months

January 2021 start date is preferred

CV and contact details for two references before 30 September 2020 to

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