

(Ref. No. JPC – 07)

Job title: Post-Doctoral Research in Germanium Junctionless Transistors
Funding Agency: SFI
Responsible To: Jean-Pierre Colinge + Cindy Colinge

Background

The Junctionless Transistor is a recent invention made at Tyndall. It has been accepted for publication in the journal Nature. Such a transistor is much easier to fabricate than a conventional one and offers the promise of cheaper integrated circuit fabrication. The junctionless architecture also makes the realisation of germanium CMOS circuits possible.

The proposed research work aims at developing (simulation, fabrication and characterisation) junctionless germanium CMOS technology.

We will combine the expertise gathered in Tyndall in the fields of germanium-on-insulator material fabrication, germanium doping and ALD dielectric deposition with the processing capabilities of the silicon clean room (e-beam lithography, etc.) to fabricate the devices. We will use advanced simulation tools (both classical and quantum) to model the devices and predict their properties. The device design will be such that the electric field near the drain is maximised when the device is turned off in order to obtain impact ionization below threshold in order to achieve a sharp subthreshold slope. The power consumption and speed performance of this technology will be assessed by fabricating small test circuits.

Main Duties and Responsibilities

- The candidate will develop the different aspects of device fabrication (GeOI material fabrication, e-beam lithography resolution improvement, gate stack formation).
- The candidate should be familiar with semiconductor device fabrication and be a hands-on person who goes in the fab to work on device processing steps.
- The candidate will supervise PhD students working on that project.

Qualifications/Start Date

- The candidate must have a doctoral degree in the field of SOI devices with a strong publication record that accurately reflects his/her activity in the field.
- Available January 2011.

Knowledge and Experience

- Direct research experience in physical and electrical characterization of semiconductor materials and devices.
- Experience in handling/using/ fabricating germanium.
- Experience in an international research environment.
- Experience in graduate student supervision or 3rd-level teaching.

Skills and Abilities

- Experimental planning
- Analysis of physical and electrical data for semiconductor materials and devices
- Ability to disseminate research material effectively
- Good organizational, report writing and interpersonal skills
- Supervisory skills (for supervision of undergraduate and research students)

For further details please contact JP Colinge (Tel: + 353 21 4904865, email: jean-pierre.colinge@tyndall.ie)

At this time, Tyndall National Institute does not require the assistance of recruitment agencies.

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