

Helmholtz Call for 2018 CSC Fellowship A

Helmholtz Centre: Forschungszentrum Juelich GmbH – www.fz-juelich.de

Department/Institute: Peter Grünberg Institute, Semiconductor Nanoel
<http://www.fz-juelich.de/pgi/pgi-9/EN/Home/home>

Supervising scientist: Dr. Dan Buca

University for Registration (for those looking for a dissertation): RWTH Aachen University

Research Field: Key Technology/ Group IV photonic devices

Position: PhD Student or Sandwich PhD Student

Research Area:

Group IV photonics aims at the realization of fully integrated electronic-photonic circuits. Integration is meant to reduce power consumption, size and cost in high performance photonic components have to be compatible with the Si manufacturing technology, and the microelectronics industry is founded. The alloying of Ge with Sn leads to the formation of a direct bandgap semiconductor for Sn concentration in excess of ~9 at.%, as experimentally proven in different cavity configurations such as Fabry-Perot waveguides and resonant microdiodes. GeSn alloys featuring Sn concentrations between 8 at.% and 14 at.%, were studied, especially in the wavelength range between 2.0 μm and 2.6 μm . This wavelength range enables possible applications in the detection of molecules containing C-H or O-H bonds.

The objective of this project is to fabricate and characterize CMOS integrative light emitters and modulators based on GeSn and SiGeSn alloys. The heterostructures and device fabrication, surface passivation and the metallic contacts have to be optimized. The design of the LEDs and the fabrication on GeSn based lasers and benchmarked with III-V technology.

All these tasks require extensive process investigations, structural and electrical characterizations, heterostructures and the production of test devices (diodes). A fully equipped clean room and various deposition tools as well as numerous analysis methods are available.

The work is done in collaboration with RWTH Aachen University and includes cooperation with the University of Leeds, UK for band structure calculations and CEA-LETI, France on material side.

A successful PhD-thesis may be defended at the university RWTH Aachen.

Specific Requirements:

- Excellent knowledge of solid state physics and possibly device physics
- The ability to work and communicate within a scientific team in fluently

Duration of stay: 2 years (Sandwich PhD); 4 years (PhD)

Work Place: Forschungszentrum Juelich, Germany (near Cologne)

Earliest Start: September 2018

Language Requirement: Very good knowledge of English language, written and spoken. A German language course will be offered parallel to the PhD program.

Name and Address of the Supervisor: Dr. Dan Buca, Forschungszentrum Juelich, Peter Grünberg Institute (PGI 9), 52425 Juelich, Germany
d.b.buca@fz-juelich.de

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Earliest Start: Sep

Language Requirements:

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Department/Institute: Nuclea
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Supervising scientist: Susan

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Research Field: Hadro

Position: PhD S

Research Area:

We study decays of Λ and Σ baryons and the dynamics of hadrons. The intrinsic structure of these baryons and their decays with dileptons and photons will be investigated. The form factors will have significant impact on the sign model. They are observed in the decays of the η and η' mesons and add to the understanding of the ratios. The utilized model is based on the meson exchange. We analyze data from COSY-Jülich and the data sets are available. The experiment has been upgraded and improved. We have positions available for the analysis of the or upcoming data.

Specific Requirements:

master's degree
programming
familiarity with
team work
work in an int

Duration of stay: 24 months

Work Place: Forsch

Earliest Start: September

Language Requirement: Very
Germ.

Name and Address of the Supervisor:
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