

Thesis Project Offer

Joint Research and Education Programme "Palestinian-German Science Bridge PGSB"
Forschungszentrum Jülich GmbH & Palestine Academy for Science and Technology

Thesis type*

<input type="checkbox"/> BSc	<input checked="" type="checkbox"/> MSc	<input type="checkbox"/> PhD	Intended starting date (approx.):
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Title	Degree	First name	Surname
Title	Degree		
Phone		E-mail	
University/institution		Department/faculty/institute	

Project description*

Validation of finite element analysis on carbon fiber composite (CFC) structures with digital image correlation (DIC).

The Central Institute of Engineering, Electronics and Analytics – Engineering and Technology (ZEA-1) is a scientific technical institute of the Forschungszentrum Jülich GmbH. Mission of ZEA-1 is the design, the development, and the fabrication of scientific and technical equipment, instruments, and processes that are essential for excellent science but are not commercially available.

The core competencies of ZEA-1 are technology development and mechanical engineering of equipment, spectrometers and other components for research using neutron, photon, and hadron beams, for energy and environment research, for soil and plant investigations and for the neuroscience. ZEA-1 has broad and longtime experiences in innovative manufacturing techniques, joining technologies, measurement technologies, automation, and calculation and numerical simulation methods.

In the framework of the "Palestinian-German Science Bridge" education program we offer a fellowship for a master thesis about the validation of finite element analysis on carbon fiber

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composite (CFC) structures with digital image correlation (DIC).

Crucial for detector systems is the stability and the dimensional accuracy of the support structure. From the physical point of view, the mass of the structure should be as low as possible, to prevent shielding of particles. In order to meet these two requirements computer simulations are carried out during the design process to minimize the weight of the support structure. In particular modern support structures for particle detectors are composed of carbon foams; high fiber content CFC materials and polymethacrylimide (PMI) based foams. Master Thesis: "Optimization of the homogeneity of magnetic fields generated by the arrangement of identical permanent magnets." Especially this mixture of materials - which are glued together - complicates the simulation models very strongly.

During the thesis work FEM calculations for CFC compound materials should be validated. The challenge is to assemble a digital image correlation system (DIC) to measure the deformations of CFC-structures under mechanical stress. Furthermore, the obtained measurement data must be evaluated and converted, in order to compare them with the results of the simulations.

Date*

Signature*

27.10.2017

Prof. Dr. G. Natour

* required field

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