Thesis Project Offer

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

Thesis type*  
- [ ] BSc  
- [x] MSc  
- [ ] PhD  
Intended starting date (approx.): flexible

Contact details of supervisor/responsible host at Forschungszentrum Jülich

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Institute and homepage of institute*  
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http://www.fz-juelich.de/jcns/EN/Home/home_node.html

University affiliation in Germany*  
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Co-Supervisor at Palestinian university (if applicable)

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E-mail

University/institution  

Department/faculty/institute

Project description*

Development and Construction of Neutron Source Components

The Jülich Center for Neutron Science (JCNS) develops and operates neutron scattering instruments at some of the best neutron sources worldwide. Unfortunately in future, an ongoing shutdown of reactor based neutron sources across Europe is expected and consequentially a concentration of research with neutrons to the few remaining, powerful sources. In order to face the potential lack of neutron beam time and to ensure neutron provision JCNS started a project to develop and realize a high brilliance accelerator driven neutron source (HBS).

HBS utilizes nuclear reactions for neutron production by bombarding light elements such as beryllium or vanadium with accelerated protons or deuterons. The occurring neutrons need to be slowed down by moderators to fit to the experimental needs. In this context, we propose two Master Thesis on selected engineering tasks:
- Development of a low dimensional, closed cycle mesitylene moderator with cryogenic supply
- Development of a single beamline target station (SBTS) optimized for a maximum neutron flux at a single neutron beam line
The goals of these projects are the CAD constructions of the cryostat moderator system and the "donut"-target system, respectively. The construction shall include a FEM based thermal dimensioning and a stress analysis. The cryostat moderator consists of approximately 100 ml cold mesitylene reservoir inside an isolation vacuum and a connected cryostat. The single beamline target station (SBTS) is based on a circular target ring with a few cm in diameter. A special mounting need to be constructed including a water based cooling option to remove the thermal load from the target. After finalizing the designs, we plan to manufacture and intensive test both systems.

The ideal candidate will major in engineering. Practical experience with FEM simulations and computer-aided design as well as knowledge in the field of thermal- and stress analysis are advantageous. We offer interdisciplinary education and the contribution to an entire new project that requires creative solutions.

Date*  Signature*
17.10.2017  

* required field