DAAD Deutscher Akademischer Austausch Dienst
German Academic Exchange Service
Section 425 – South Asia
Contact: Susanne Scherzer (scherzer@daad.de)

Approval Form by German Host (Head of the Department)

WISE – Working Internships in Science and Engineering

I would like to involve an Indian student in my research work for the following time period in 2015:

Internship period: **05 May 2015 –- 27 July 2015**

German Supervisor:

Name: Prof. Dr. Otfried Gühne

University/ Research Institution: University of Siegen, Departmen of Physics

Address: Walter-Flex-Str. 3, 57068 Siegen, Germany

Telephone & Fax: Tel. ++49 271 740 3707, Fax ++49 271 740 3807

Email: otfried.guehne@uni-siegen.de

Student Applicant:

Name and Application number (PKZ): Atul Singh Arora PKZ: not applicable

Address: 4317/3 Ansari Road, Darya Ganj, New Delhi-110002

Telephone: +91 8699413350

Email: to.AtulArora@gmail.com

Subject/Specialization: Quantum Information Theory

Title of the research project: Quantum information with modular variables

Brief description of the research project (including notes on the experimental techniques used and possible tasks to be assigned to the research assistant):

The predictions of quantum mechanics differ in a fundamental way from those of classical physics or more general realistic (hidden variable) theories, which, for example, are manifested in the violation of various classical no-go theorems. These predictions are accurately confirmed on a microscopic level with photons and atoms, but similar tests with more massive systems are still challenging. Recently, an experimentally feasible approach for performing such tests has been proposed [Phys. Rev. Lett. 112, 190402 (2014)]. This scheme enables the measurement of modular variables of macroscopic continuous variable systems. In this project we will investigate, how modular variables can further be used for probing genuine quantum effects. This concerns, for example, the question to which extent correlations of modular variables violate a Leggett-Garg inequality or can be applied for tests of quantum contextuality. Furthermore, modular variables can be used for characterization and estimation of the quantum properties like entanglement of continuous variable states, which is a promising route for further application of modular variables in quantum foundations problems.

Is practical experience necessary? ___ Yes X No

Which other conditions does the applicant have to fulfill?

Basic knowledge about the theory of quantum computing

What knowledge of German is mandatory for the research internship(s)?

___ good ___ fair ___ poor X none

Universität Siegen
Naturwissenschaftlich-Technische Fakultät
Department Physik
Walter-Flex-Str. 3, 57068 Siegen

Date, signature of the German Host (Head of the department)

- Description of the research project can be mentioned either in the approval form or in the invitation letter