cost TD1102
PHOTOTECH: BIOSENSORS & BIOCHIPS

Short Term Scientific Mission

TD1102-27772

Project: *The impact of solvent viscosity on reaction kinetics: light-driven catalysis in Photosystem II (PSII) investigated in various glycerol-water matrices*

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Period of STMS (begin- and end date): 14/06-17/07/2015
Host institution (address): Freie Universität Berlin Fachbereich Physik,Berlin
Mentor(s) (name and contact data): Prof. DAU Holger

Aims & subject of work (480 characters, no spaces; Calibri 12):

The group of Prof. DAU have detected first indications that activation enthalpies are strongly modified on increasing glycerol concentrations. These findings have led to the working hypothesis that the detected change on PSII function results from an influence of the increased solvent viscosity on the protein dynamics. This is in line with earlier investigation on (clearly smaller) biological macromolecules, for which a strongly reduction of the extent of the protein structural fluctuations amplitude on increasing the glycerol concentration has been revealed by neutron scattering experiments. To get a more detailed dynamical picture and to better understand the relation with the activity of the PSII we intend to correlate the PSII ns-ps dynamics, as measured by NS experiments, and its electron and proton transfer performance.

Argumentation of necessity of STSM (100 characters, no spaces; Calibri 12):

The visit aim to strengthen an already existing collaboration with Prof. Dau Holger in the framework of the Cost Action allowing reciprocal knowledge exchange on the topics of the STSM. In addition we are also interested to establish the foundation for long-term collaborative research on green algae with genetically modified photosystems

Workplan/timeschedule followed (4 bullets max., Calibri 12):

- 1) Purification and characterization of PSII in various glycerol matrix for neutron scattering experiment scheduled October 2015 at the FRM2 in Munich (Germany).
- 2) Discussion, planning and preparation of the forthcoming elastic neutron scattering experiment and proposals for future beamtime applications.

Main results and outcome (conclusions):

The visit aimed to strengthen the already existing collaboration with Prof Holger DAU allowing discussion and preparation of the future neutron scattering experiments. In addition, I was also able to investigate correlations among structural, dynamics and functional proprieties natural and mutated photosynthetic D1 reaction centre protein in green algae using time-resolved investigation of *prompt and delayed fluorescence*.