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From :

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To :

Whom this may concern

Date: 20 July 2005

Number of pages: 3

Concerning : short-term visit of Dr. Andrea Cannizzo (Ecole Polytechnique Fédérale de Lausanne, Switzerland), to Dr. E.T.J. Nibbering (Max Born Institute of Berlin, Germany) and Prof. Schwentner (Freie Universität of Berlin (Germany)).

Dear Sirs,

In the following, please find the scientific report on the project "Multidimensional photo-echo set-up to investigate interactions within proteins", which concerns a short-term visit of Dr. Andrea Cannizzo, of the Ecole Polytechnique Fédérale de Lausanne (Switzerland), to Dr. E.T.J. Nibbering of the Max Born Institute of Berlin (Germany) and Prof. Schwentner of the Freie Universität of Berlin.

Thanking in advance,

Yours faithfully

Andrea Cannizzo

TITLE OF THE PROPOSED PROJECT: "Multidimensional photo-echo set-up to investigate interactions within proteins".

Dr A. Cannizzo has recently started as a post doc a research activity aimed at investigating biological systems (in particular heme and retinal proteins) with vibrational and electronic multi-dimensional (MD) ultrafast techniques. To this aim, he plans to implement a heterodyne-detected 3D photo-echo (PE) set-up to investigate the first dynamics of proteins and the role of the solvent. This is a new technological development for his group and at present, he is dedicating the most part of his time to broaden his knowledge and develop know-how on MD spectroscopies.

The aim of this application was to visit the Elsaesser group at the Max Born Institute of Berlin and in particular the labs of the Dr. E.T.J. Nibbering, which has a solid experience and a fully equipped lab, giving to Dr. Cannizzo the possibility of deepening both theoretical and experimental aspects. During his stay in Berlin, he also visited the labs of Prof. Schwentner at the Freie Universität of Berlin and deepened some aspects concerning condensed phase photochemistry probed with ultrafast spectroscopy.

Indeed, during the stay by Prof. Schwentner's group, the applicant had a series of useful discussions with the members of this group. In particular he faced with Dr. Markus Gühr and Mizuho Fushitani the theoretical and experimental aspects concerning dephasing and dispersion of vibrational wavepacket and the control of wavepacket-lattice interaction with phase-locked pulses. He was also introduced by Dr. M. Fushitani to the active phase-lock stabilization and the polarization gated FROG techniques.

Visiting the Nibbering's group, he broadened his knowledge on heterodyne-detected 3D photo-echo set-ups in the IR range and the limitation of extending IR set-ups to the UV-Vis range. These aspects were mainly discussed with Nils Huse, who personally developed the 3D-PE set-up and showed to Dr. Cannizzo their recent results on the coherent vibrational response of hydrogen bonds in water (*Nature* **434** (2005) 199-202) to comment the power of MD spectroscopies in investigating solvation dynamics and memory loss of a liquid system. A short meeting with Omar F. Mohammed of the Nibbering's group introduced the applicant to the investigation of photo-acidity phenomenon and intramolecular proton-transfer by ultrafast IR and Vis spectroscopies.

Summarizing, the visit has been highly formative for Dr. Cannizzo both for the quality and for the quantity of the discussions and, in the light of the project's purpose, it can be considered fully successful.

Concerning future collaborations, it has been explicitly planned a series of meetings in the next months to share more information and to find a common research field. In particular, Mr. N.Huse is planning to visit Chergu's group in the mid-September, a new collaboration with Dr. M.Gühr and Chergui's

group will start after the summer season and another meeting between Dr. Cannizzo and Pr. Schwenter's group is planned around the next February.

Considering that this visit has mainly the aim of sharing know-how more than of performing a research work, no articles or publications are expected to result directly from this grant.