**NAUSICAA workshop**

Institut Laue-Langevin, Seminar room 1st floor,

6 rue Jules Horowitz, 38042 Grenoble, FRANCE

July 1st-2nd 2014

# *Minutes*

Attendees: E.Guarini (Univ. Firenze), G.Noguere (CEA/DEN), C.Morkel (TUM), A.Roehrmoser (TUM), W.Haeck (IRSN), S.Pignet (IRSN), J.Miss (IRSN), G.Murher (ESS), G.Marleau (Ecole Polytechnique), E.Farhi (ILL), Y.Calzavara (ILL), V.Nesvizhevski (ILL)

Excused: J.I. Marquez Damian (Centro Atomico Bariloche), Li Gang (AECL), Sean O’Kelly (NIST), D.Roubstov (AECL), P.Geltenbort (ILL)

## Discussion

The NAUSICAA workshop was the kick-off meeting of a collaborative project aiming to increase the accuracy of thermal neutron cross section data thanks to a new way to evaluate these data.

Most recent results on light and heavy water as well as liquid hydrogen were presented and discussed.

No specific organization or formalization of the NAUSICAA group was proposed or discussed. Indeed, this collaborative project is based upon the good will of each partner and will remain efficient as long as all partners accept to share resources and collaborate for finding external funding.

## Expectations

Each of participant institutes shared its expectations in the large field covered by NAUSICAA.

The CEA is more interested by water, light and heavy, and ambient P and moderate T (up to 80°C) in a first step and for working in the framework of the OECD/NEA and of the Jeff meeting.

The IRSN is mostly interested by light water and high T and P, but as well a bit by heavy water. They also need that the necessity of further experiments to increase the cross sections accuracy is proved.

The Ecole Polytechnique de Montréal highlights its strong interest in heavy water in several conditions of T and P but especially in supercritical conditions (250 bar and 600°C).

The ESS interest is mainly focused on liquid deuterium but liquid hydrogen and water are interesting for them as well.

TUM major topic in data consistency work is for UCN production through liquid and/or solid deuterium, which are their main fields of interest. On the other hand TUM has a great focus on benchmarking with H/D scatter data for research reactor and cold/ultracold source evaluation.

The University of Florence is interested by any cryogenic liquids and mainly liquid hydrogen and deuterium.

All attendees found a common interest in working together on both water and cryogenic liquids as a first step.

## Resources

Each attendee proposed to share resources on this project which mainly requires manpower. The CEA proposed to share a PhD student that is today mainly focused on covariance but could work on water as well. The ESS proposed to fund, if possible, a master student and a Marie Curie funded post-doc. TUM is funding, in collaboration with the ILL, a PhD student who will work on cold hydrogen/deuterium, both liquid and solid. The Ecole Polytechnique de Montréal proposed to fund students. The University of Florence proposed a PhD student who will work on quantum simulations. The ILL proposed to request funding for master students and PhD for working on cryogenic liquids.

## Actions

It was agreed by all attendees that the following actions will be carried out in the framework of the NAUSICAA group.

1. Request for taking part of a working group at the NEA, for a limited number of materials first (heavy and light water, liquid hydrogen). The first step will be to present our project to the next JEFF meeting in November 2014. Then, we could join NEA’s WPEC organization (Working Party on International Nuclear Data Evaluation Co-operation) with a subgroup on thermal neutron cross sections, led by Skip Kahler and Luiz Leal, that shall be launched in May 2015 for 3 years.
2. Consider the relevancy of carrying out HT/HP experiments on water. The ILL will try to get funding for a master student on Molecular Dynamics. The IRSN will study the current situation.
3. Consider supercritical water (250bar & 600°C). The first stage will be modelling this complex system by the Ecole Polytechnique de Montréal.
4. Measure with the highest available accuracy the S(q,w) of light and heavy water up to 80°C, every 10°C and at ambient P. Proposals will be submitted to both the ILL (IN5, IN4 and possibly IN1) and the FRM2 (TOFTOF). A high pressure vessel is also available, such that higher pressure/temperature data for water could also be considered in future.
5. Measure liquid deuterium and hydrogen on the ILL BRISP instrument (then on IN4 and IN5).
6. Funding will be requested for students by all NAUSICAA partners.
7. Share the currently available S(a,b) to the NAUSICAA partners once they are validated by the ILL and the IRSN. TUM will also contribute to the benchmarking as early as the data are available for the group.
8. Attend to the ICANS conference. If the ILL can’t attend, the ESS could represent the NAUSICAA group