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15 September 2014

Re: Support to a beam time request at ILL instruments IN4 & IN5

Dear Dr. Calzavara,

With this letter, the Joint Evaluated Fission and Fusion File (JEFF) project would like to express its support to your request for beam time for  $H_2O$  and  $D_2O$   $S(Q,\omega)$  measurements at ILL.

At neutron energies below  $\sim 5$  eV, the binding of the scattering nuclei in a moderator material affects the neutron cross section and the energy and angular distribution of secondary neutrons, as the incident neutrons can lose or gain energy in the interactions. In evaluated nuclear data files like JEFF-3.1, these effects are described by sub-libraries where the thermal scattering law  $S$  is parameterized in terms of momentum transfer  $Q$  (or  $\alpha$ ) and energy transfer  $\omega$  (or  $\beta$ ).

The underlying scattering dynamics models have remained essentially unchanged for the past 20 years. Attempts to update these complex models and the corresponding JEFF evaluated files have been hampered by the lack of new high-quality experimental data. Yet, recent impact studies have shown that, for some nuclear applications, improvements are required, especially for H bound in  $H_2O$ , D bound in  $D_2O$ , H bound in metal hydrides such as  $ZrH_x$ , as well as for other compounds in various states, covering an extended range and finer grids for  $Q$  and  $\omega$ , at temperatures of  $20^\circ C$  and above. This has been reported at JEFF meetings on several occasions. Other nuclear data file projects face the same difficulty.

Therefore, the JEFF Project welcomes and supports your proposal to perform some of the needed measurements at ILL, using the high-performance TOF spectrometers available there. The JEFF project would also welcome your participation to the upcoming JEFF meetings, as several groups have expressed interest in collaborating on  $S(Q,\omega)$  scattering models, data and evaluations.

Yours Sincerely,



Dr. Robert Jacqmin  
JEFF Chairman

*Joint Evaluated Fission and Fusion File Project*

cc: JEFF Scientific Co-ordination Group  
Franco Michel-Sendis, OECD/NEA Secretariat for JEFF