

Standards for Sample Environment at Ultra Low Temperatures at Neutron Scattering Facilities

Leading beneficiary: to be defined

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Estimated budget

Each partner requires 7 month of manpower and 20kEuro

Abstract of your innovative activity: *(please make sure that you mention the following points)*

1. State of the Art

Following the material properties as a function of temperature is like opening a Russian Doll. On lowering the temperature more energetic processes will freeze out opening the view at low energy excitations and new states of matter. Temperatures as low as 10mK are readily achievable using commercial cryostats. However, to reach this temperature on the specimen of interest is a much more complicated endeavor and usually calls for individual solutions.

All neutron scattering facilities have to tackle the same problems when providing ultra low temperature sample environment. At low temperatures the thermal response of the sample as well as the cryostat increase and sample equilibration as well as the cooling of the cryostat occupy sizable part measurement time.

With this proposal we would like to undertake a collaborative effort towards a standards of accurate sample temperature determination, thermal anchoring and in-situ sample manipulation. The possibility to realign the sample for example within a cold cryostat avoids time consuming warming and cooling procedures thereby increasing the efficiency of beam-time usage.

As a result we hope to have standard procedures and sample holder design considerations, which can be followed by the user community when preparing for an experiment and will ensure an accurate sample temperature reading. This would lead towards a basic standard for sample environment for ULT, which improves the accessibility and fosters the mobility of users between the European scattering facilities.