

Intro Course in Neutron Scattering

Zoom, 14 October – 5 November 2021

Guidelines for the Examination

Task: Write a proposal for beamtime at a neutron facility

Format (strict!):

- 1 + 3 pages of A4 paper size
- Font: Arial, size 11 pt
- 2.0 cm margins for all sides

Here your final task will include 2 different parts. The first part (max 1 page) is a general part where you describe your current PhD/research project in order to give us a background. Here you should also motivate why you think neutrons can help you, which source/technique you have chosen and why. The second part (max 3 pages) will be very similar to a real proposal with “standardized” template and subsections. Please note that the template differs slightly between different sources.

Submission: The proposal should be sent to Martin Månsson by e-mail: condmat@kth.se
Use the following subject line in the e-mail: “Tartu Beamtime Proposal 2021”

Deadline: **21 November 2021**

In Addition: **Attend all (most of) lectures + actively conduct/ Participate in all e-learning (to get 4 ECTS)**

Part 1: Affiliated Background Information (Max 1 page in total)

1.1 PhD/Research Project

Describe your PhD research project and put it into a broader scientific context

1.2 The Experiment

Briefly (!) describe the experiment you wish to focus on and how it is connected/important for your research project (more details in part 2)

1.3 Why Neutrons?

Describe why it is preferably to use neutrons for this investigation (e.g. vs. X-rays).

1.4 Chosen Technique

Describe which neutron technique you aim to use and motivate why.

1.5 Chosen Source/Instrument

Describe which neutron source and which neutron instrument you have selected and motivate why they were selected for this.

Part 2: The proposal (Max 3 pages in total, including figures & references)

General guideline for the proposal: Be brief, clear and emphasize importance of the proposed experiment as well as clearly show feasibility (i.e. motivate why you should be given beamtime at a very expensive neutron facility). Each beamtime committee member will read a lot of proposals and can not spend too much time on each one. They cannot spend too much time “decoding your proposal”. Figures and figure captions should not be too complicated and readable even when printed on paper. Remove all this text and the text below, simply keep the blue subsections together with your own original text.

2.1 Scientific Background

“Set the scene” by giving a short introduction to the scientific field you aim to address. Be brief (not more than 0.5 page) and focus on why this is an interesting and important field. Only use key references and also emphasize if you and/or your group has made prior important contributions/publications to this field.

2.2 Proposed Experiment

Describe what you want to do in the proposed experiment and WHY this is important (i.e. the purpose of the experiment). Emphasize why you need neutron scattering, how the proposed technique will be useful, potentially why the source/instrument is chosen over others. A schematic figure might be useful in this section.

2.3 Preliminary Results

Prior to submitting an official proposal, it is common that your group (or someone else) has already performed test experiments using neutron scattering (or related X-ray techniques) on the sample in question (or very similar sample). This is an important piece of information since it will give a strong indication for the feasibility of the proposed experiment. Usually this is will require showing some data in a figure or give reference if the results are published.

2.4 Details Related to the Sample(s)

This subsection handles details around your sample. In a real proposal part of this information is usually (but not always) given in a separate online form. Information should include e.g.:

- *Sample properties (mass, powder/crystal...)*
- *Pre-characterizations performed on your sample (to show properties and quality i.e. figure or reference will be needed!)*
- *Sample mounting for your proposed experiment*
- *Sample environment needed (cryostat, furnace, in situ cell, pressure cell, magnet, ...)*

2.5 Detailed Experimental Plan & Beamtime Estimate

Describe in detail which experiment will be performed in practice e.g. “temperature scans from T1 to T2 in steps of ΔT for samples #1 and #2”. Try to estimate the needed statistics/measurement time (from experience or from discussions with instrument responsible). Give a total estimate for the needed measurement time + minimal setup time. Sometime it is favorable to write part of this section as a bullet list.

2.6 Additional Information

This could e.g. include:

- *Safety Considerations*
- *Funding sources for the project*
- *Discussions with the beamline scientist*

2.7 References

List relevant references (scientific background, previous results and sample characterizations etc.)

Guideline: 5-10 references is more than enough!