Contribution ID: **37** Type: **not specified**

Combining diffraction and imaging for the study of structural phase transitions

Tuesday, 17 April 2012 09:00 (30 minutes)

Reciprocal-space techniques, among them neutron diffraction, are a common tools for the investigation of structural phase transitions. Neutron imaging, which provides direct-space information on the macro-scale, is still a rarity for this kind of studies. Here we present an example demonstrating the potential of combining both techniques. We will illustrate it with a temperature dependent study of the phase transformations, melting and re-crystallization of a heavy eutectic alloy containing gold and lead [1]. Besides complementary insight on the volume anomalies at the transitions, we show that neutron imaging provides unique, time-resolved information on the spatial fluctuations of the alloy density and composition across the melting point [2]. This information, impossible to obtain from x-ray imaging, is of enormous relevance for the understanding and modelling of crystallization processes, many of them of high technological relevance in metallurgy and engineering.

[1] M. Medarde et al., J. Nucl. Mater. 441, 72-82 (2011),
[2] R. Simons et al., in preparation.

Primary authors: Dr MEDARDE, Marisa (Laboratory for Developments and Methods, Paul Scherrer Institut); Mr SIMONS, Richard (Spallation Neutron Source Division, Paul Scherrer Institut)

Co-authors: Dr KAESTNER, Anders (Spallation Neutron Source Division, Paul Scherrer Institut); Dr LEHMANN, Eberhard (Spallation Neutron Source Division, Paul Scherrer Institut); Dr CONDER, Kazimierz (Laboratory for Developments and Methods, Paul Scherrer Institut); Dr KELLER, Lukas (Laboratory for Neutron Scattering, Paul Scherrer Institut)

Presenter: Dr MEDARDE, Marisa (Laboratory for Developments and Methods, Paul Scherrer Institut)

Session Classification: Material research / Metallurgy