

The Application of Inelastic Neutron Scattering to Temporary Questions on the Particle Dynamics in Liquid Metals

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The talk will try to give a justification why it is important and interesting to study structure and dynamics of liquid metals not only at melting point conditions but along the full range of the liquid state. Liquid metals pass through a chemical transformation and suffer a metal to non-metal transition due to electron localization if they are sufficiently expanded. Their phase diagram is hence rather a mixture of “phases” associated with the metallic and the non metallic regime. Especially interesting is the transition region, where both regimes are in strong competition, depending on the exact thermodynamic state. How does and how could this competition show up in the scattering laws of these substances? Some data obtained from inelastic neutron- and x-ray scattering experiments will be presented and discussed. What are the new horizons in this field? How can new and modern scattering techniques help to cope with the related experimental challenges? What are the requirements to develop new sample environments for matter under extreme conditions of temperature and pressure? Advantages and disadvantages of neutron- and x-ray scattering techniques will be discussed especially in view of the new low angle time-of-flight spectrometer BRISP which has recently been installed at the Institute Laue Langevin.