

August 11-14th at the Crowne Plaza Hotel in downtown Knoxville, TN



Contribution ID: 17

Type: **Contributed Talk**

Complexity in the medium-range order as a polyvalent liquid metal

Gallium is a prototypical liquid metal and has gained resurgent attention due to its unique properties. Its atomic dynamics remain elusive despite a large number of studies, mainly due to the challenges of quantifying the atomic-scale dynamics of liquids. Recent developments in inelastic neutron scattering enable us to measure the Van Hove correlation function that describes the real-space motion of liquid atoms. In this work, we use this approach to reveal the dynamics in gallium liquids and find the co-existence of two medium-range orders (MROs), which have a distinct dynamical behavior from that of the short-range order (SRO). We propose that the two types of MRO are strongly overlapping in space and fluctuating in time and are the basis for anomalous behavior of liquid gallium. This view challenges the current view that liquid gallium consists of fluctuating metallic and insulating domains. These findings shed new light on the interpretation of similar microscopic anomalies observed in other semi-metallic liquids.

Topical Area

Soft matter: polymers, and complex fluids

Author: HUA, Chengyun (Oak Ridge National Laboratory)

Co-authors: ABERNATHY, Doug (Oak Ridge National Laboratory); ZARKADOULA, Eva (Oak Ridge National Laboratory); Prof. EGAMI, Takeshi (University of Tennessee at Knoxville); Dr DMOWSKI, Wojciech (University of Tennessee at Knoxville); SARATHCHANDRAN, Yadu Krishnan (University of Tennessee, Knoxville)

Presenter: HUA, Chengyun (Oak Ridge National Laboratory)