

Local geometric structures of instantaneous resonant modes in Gallium liquids

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In terms of instantaneous-normal-mode (INM) analysis and a newly defined measure for quasilocalization, some of us have presented the evidence for the existence [1] of resonant modes, which are low-frequency, quasilocalized vibrational excitations, and their characters [2] in simple dense fluids with short-ranged interactions. The resonant modes in fluids are thus referred as the instantaneous resonant modes (IRMs). With the same analytic technique, we recently have shown the strong numerical evidence of the IRMs in high-temperature Gallium liquid [3], in which particle interaction is long-ranged. However, the occurrence of the IRMs in Gallium liquids is attributed to the well-known curvature change in the repulsive core of the Gallium pseudopotential. In this work, we will analyze the local geometric structures around the quasilocalized centers of the IRMs in Gallium liquids.

[1] T. M. Wu and W. J. Ma, *J. Chem. Phys.* **110**, 447 (1999).

[2] T. M. Wu, W. J. Ma, and S. L. Chang, *J. Chem. Phys.* **113**, 274 (2000).

[3] T. M. Wu, S. F. Tsay, S. L. Chang, and W. J. Ma, submitted to *Phys. Rev. B*.