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Role of Icosahedral Short-range-order in Undercooled Liquids of Zr-Ti-Cu-Ni-Al Alloys on Bulk Metallic Glass Formation[1] A. K. GANGOPADHYAY, G. W. LEE, T. H. KIM, K. F. KELTON, Washington Univ., St. Louis, R. C. BRADSHAW, R. W. HYERS, Univ. Massachusetts, Amherst, T. J. RATHZ, Univ. Alabama, Huntsville, J. R. ROGERS, NASA MSFC, Huntsville, B. SIEVE, A. I. GOLDMAN, Iowa State Univ., Ames — The addition of a few percent of some elements often significantly improves the glass formability of bulk metallic glasses (BMG); $Zr_{62-x}Ti_xNi_{20}Cu_{10}Al_8$ (x < 8) is one such example. The role of Ti addition on short- range-order in this alloy system was studied by in-situ x-ray diffraction on levitated droplets of stable and undercooled liquids with high energy (125 keV) synchrotron x-rays on the beamline 6ID-D of the MU-CAT facility at the Advanced Photon Source (APS) at the Argonne National Lab, using the recently developed BESL (beamline electrostatic levitation) technique. The short-range-order of the liquid was found to be dominantly icosahedral (ISRO), stabilized further by Ti addition, indicating an important role of ISRO on BMG formation. Additional effects of Ti addition on dynamical properties of the liquid (e.g. viscosity) will be reported and the effects of ISRO and viscosity on nucleation and glass formation will be discussed.

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