## MS16-P01 | SHORT-RANGE STRUCTURE OF ZR AND PD BULK METALLIC GLASSES PREPARED DURING THE MELTING AND COOLING PROCESS

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Bulk metallic glasses (BMGs) represent a class of materials with superior mechanical properties that combine a high mechanical strength (about 2 GPa) and a 5 – 10 times higher elastic strain limit (1.5 – 2 %) in comparison with conventional metals [1,2]. BMGs undergo, however, catastrophic failure when deforming beyond the elastic strain limit. The macroscopic brittleness is the result of strain localization in shear bands. For the improvement of BMG fomation and processing, a thorough understanding of the crystallization kinetics is required as well as refined models of crystal nucleation from the undercooled liquid.

By means of in-situ X-ray total scattering experiments, we obtained statistically reliable data on atomic pair-pair correlation functions that is about the local structure of the Zr and Pd based BMG systems, which allowed us to estimating the bond length, the average coordination number, and the free volume, a parameter that correlates the structure with the glass forming ability [3] and mechanical properties [4]. We correlated the results about the local structure with complementary tomographic scans, allowing the pore structures of the BMG to be visualized, and with measurements on mechanical properties, thus providing a multi-scale physical picture of the investigated BMG system.

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