



GlassX - Structure and dynamics of glasses: using novel X-ray tools to push the boundaries of how we understand them

Glasses are ubiquitous in our daily lives, yet the current understanding of them is very limited. Despite decades of research, the structure and dynamics of glasses and the nature of the glass transition remain open problems in condensed matter physics. To a large extent, this is due to the intrinsic properties of glasses: they lack long-range order, which makes it difficult to fully characterise their microscopic structures; they are out-of-equilibrium by nature, which leads to temporally evolving and spatially heterogeneous dynamics. With the advent of a new generation of X-ray sources and the development of novel X-ray technologies, these challenges can now be addressed. The GlassX action thus aims at exploiting these new opportunities to significantly better our understanding of glasses. The action is divided into four parts, each addressing an important open question in glass physics. Parts 1 and 2 focus on structural properties of vapor-deposited metallic glasses, including the degree of local anisotropy and the relation between their structure and stability. Parts 3 and 4 concentrate on the dynamics of glasses, including the wave-vector dependence and the existence of dynamic heterogeneities. These projects will make use of X-ray nano-diffraction and X-ray photon correlation spectroscopy techniques, both of which will see significant improvements with the newly available fourth-generation X-ray sources, making it possible to reach previously unexplored length and time scales. The knowledge generated by the action will contribute substantially to the field of glasses, both from the aspect of basic science and in terms of possible applications. Dissemination of the results will also be an integral part of the action, with the goal to effectively communicate the research outcome and its relevance to audiences both within and outside academia.

UNIPD Supervisor: Giulio Monaco

MSCA Fellow: Peihao Sun

Department: Department of Physics and Astronomy

Coordinator: Università degli Studi di Padova (Italy)

Total EU Contribution: Euro 171.473,28

Call ID: H2020-MSCA-IF-2020

Project Duration in months: 24

Start Date: 23/08/2021

End Date: 22/08/2023

Find out more: <https://cordis.europa.eu/project/id/101023787>