

# **DYNAMICS OF GLASS FORMING POLYMERS BY NEUTRON SCATTERING AND MOLECULAR DYNAMICS SIMULATIONS**

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At local scales (in the typical inter- and intramolecular range) the properties of amorphous polymers are determined by the common features observed for glass-forming systems in general. From a dynamic point of view, this implies that the most relevant process is the so-called structural or  $\alpha$ -relaxation, which arrest at the glass-transition leads to the glassy state. In addition, secondary relaxations involving localized motions also take place in these systems. The microscopic direct observation of all these processes can be realized experimentally by using neutron scattering, which allows space-time resolution at a molecular level. The potential of this technique to unravel the microscopic mechanisms behind the relaxations can be amplified by combination with fully atomistic molecular dynamics simulations. Therefore, during the last years we have followed a strategy based in such a combination in order to study different structural and dynamical aspects of glass-forming polymers. For this talk I have chosen some showcases of the application of this methodology.