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How neutrons perceive the formation of a glass, or, how to become a neutron scattering user thanks to backscattering!

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Working on the glass transition phenomenon requires a thermodynamic and dynamical description of the materials, molecules, polymers or proteins. In text books, the phenomenon is described as a kinetic phase transition, arising between an out-of-equilibrium solid and a very viscous supercooled liquid as temperature decreases. Starting neutron scattering experiments by using backscattering technique allows non specialist users to catch immediately this description, and makes understandable the space dependence (Q) and the timescale of the process, both inputs essential for any theoretical approach. Here I would like to illustrate how backscattering experiments are essential to disentangle the roles of various control parameters on the glass formation, such temperature and pressure, molecular interactions or molecular weight dependence for polymers, or confinement dimension and surface interaction.

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