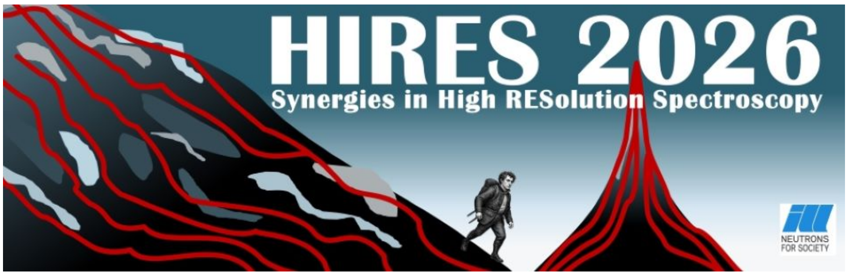

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On the origin of the non-dispersive mode in glass-forming liquids: the case of squalane

In spite of its fundamental interest, the collective dynamics of molecular liquids and glass-forming systems at the mesoscale –and its relationship with self-dynamics– is still poorly understood [1,2]. Mesoscale means distances long enough compared to intermolecular dimensions but not yet in the hydrodynamic region. Neutron scattering experiments addressing the coherent dynamic structure factor S(Q,t) there are extremely challenging due to very weak intensities, strong incoherent contributions –even in deuterated samples— and multiple scattering [1,3]. As shown by us [1,3,4], it is possible to isolate S(Q,t) by NSE combining measurements on deuterated and protonated versions of the same molecule. This procedure has allowed us to proof the dominance at the mesoscale of a Q-independent process [3,5,6]. This process observed for S(Q,t) also appears in the self-motions at the mesoscale at shorter times than diffusion [3].
Experiments in [3,5,6] were restricted to high T in a narrow range where the non-dispersive mode can be described by a single exponential. To discern the origin of the non-dispersive process its complete characterization over a large T range is crucial, addressing questions as its connection with viscosity and/or diffusion, the impact of cooperativity on the T- dependence of the characteristic time and functional form, etc.
Here we present new NSE results on squalane, trying to contribute to answering these questions.
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Session

Liquids

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