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Title:Brillouin neutron spectroscopy as a probe to investigate collective density fluctuations in biomolecules hydration water

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Abstract:The role of water in the behaviour of biomolecules is well recognized. The coupling of motions between water and biomolecules has been studied in a wide time scale for the self part while collective dynamics is still quite unexplored. Self-dynamics provides information about the diffusion processes of water molecules and relaxation processes of the protein structure. Collective density fluctuations might provide important insight on the transmission of information possibly correlated to biological functionality. The idea that hydration water layers surrounding a biological molecule show a self-dynamical signature that differs appreciably from that of bulk water, in analogy with glass-former systems, is quite accepted. In the same picture Brillouin terahertz spectroscopy has been used to directly probe collective dynamics of hydration water molecules around biosystems, showing a weaker coupling and a more bulklike behaviour. We will discuss results of collective modes of hydration water, arising from neutron Brillouin spectroscopy, in the context of biomolecules-solvent interaction.   2012 D. Russo et al.

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