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## TITLE

### Puzzle of Protein Dynamical Transition

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Despite recent extensive efforts, the nature of the dynamics of biological macromolecules still remains unclear. In particular, contradicting models have been proposed for explaining the temperature behavior of the mean square displacement, MSD, and of the system relaxation time,  $\tau$ . To solve this puzzle, different neutron scattering experiments with different instrumental energy resolutions were performed on dry and hydrated lysozyme [S. Magazù et al., J. Phys. Chem. B, 2011, 115, 7736]. The obtained results show that the so called dynamical transition: (i) is a finite instrumental energy resolution effect, and more specifically, it appears when the characteristic system relaxation time intersects the resolution time, (ii) it does not imply any transition in the dynamical properties of the systems, (iii) it is not due to the fragile-to-strong dynamical crossover (FSC) in the temperature behavior of the system relaxation time. Furthermore, the obtained results confirm the change in the  $\tau$ -temperature dependence at  $T = 220$  K of S. H. Chen et al. [Proc. Natl. Acad. Sci. U.S.A. 2006, 103, 9012] and show that it is not due to finite instrumental energy resolution effects and it is not connected to numerical errors in the data analysis protocol