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Solvent induced fluctuations and the collective librational dynamics of myoglobin, hemoglobin, and lysozyme studied with infrared spectroscopy KRISTINA WOODS, Carnegie Mellon University — We will discuss the use of (THz and Mid-) infrared spectroscopy to investigate the dynamics of several globular proteins under varying hydration and temperature conditions. Analysis of the experimental spectra has revealed that the amount of solvent in the hydration shell has a strong influence on the amplitude and the rate of relaxation associated with the low frequency protein conformational fluctuations and also the arrangement of hydrogen bonds in the protein secondary structure. At at a hydration level > 0.2 we identify modes in the secondary structure of all of the proteins investigated that suggest extra mobility in the protein structure that is not present at low hydration. We will discuss how greater insight into the origin and nature of these detected solvent induced fluctuations may be important for developing a better understanding about energy localization and its relationship with biological function.

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