VIBRATIONAL DYNAMICS FROM SMALL MOLECULES TO PROTEINS

MARTIN GRUEBELE, *Departments of Chemistry and Biophysics, and Beckman Institute for Advanced Science and Technology, University of Illinois, Urbana, Illinois 61801.*

Frequency and time resolved spectroscopic studies of small to medium-size organic molecules demonstrate slow temporal scaling of energy redistribution among the skeletal vibrations. These results are interpreted using quantum dynamics simulations and analytical models, and could be exploited to manipulate vibrational coherence at high energies.[a] In bigger molecules, the large amplitude motions lead to nonlocal interactions. Wavelength and time resolved fluorescence spectroscopy of both artificial and natural polymers (e.g. proteins) reveals rich folding and self-assembly dynamics which can be understood by using surprisingly simple statistical mechanical models.[b]

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[a]M. Gruebele, "Molecular vibrational dephasing," Adv. Chem. Phys., in press (2000).
[b]M. Gruebele, "The physical chemistry of protein folding," Annu. Rev. Phys. Chem. **50**, 485 (1999).