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## Protein Dynamics in Complex Environments

*Tuesday, 8 June 2021 11:10 (30 minutes)*

After an introduction into strategies for controlling the time-averaged behavior of aqueous protein solutions in the bulk at near interfaces, we discuss their dynamical behavior.

First, this concerns the impact of temperature, salt concentration, protein concentration and other control parameters on the diffusion in equilibrium.

Second, we study how the dynamics in these complex systems changes if phase transitions are triggered. Examples are aggregation phenomena, network formation upon denaturation, phase separation, such as liquid-liquid phase separation, or crystallization. An important challenge in this context is the separation of the relevant time scales, and, under favorable circumstances, the separation of kinetics and dynamics.

We attempt a holistic discussion of the broad range of length and time scales, and we emphasize the need of using several complementary techniques to cover these, as well as the associated practical challenges.

Finally, we comment on models and theories suitable for a comprehensive explanation of these phenomena.

Invaluable contributions by numerous collaborators are gratefully acknowledged.

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- [2] M. Grimaldo et al., JPCL, 10, 1709 (2019)
- [3] M. Grimaldo et al., Quart. Rev. Biophys., 52, e7, 1 (2019)
- [4] M. R. Fries et al., PRL, 119, 228001 (2017)
- [5] N. Begam et al., PRL, 126, 098001 (2021)
- [6] A. Girelli et al., PRL, 126, 138004 (2021)
- [7] A. Girelli et al., in preparation (2021)

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