Time and spectral domain analysis of biodiffusion

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Microrheology is the study of the properties of a complex fluid through the diffusion dynamics of small particles, typically latex beads, moving through that material. Currently, it is the dominant technique in the study of the physical properties of biological fluids, of the material properties of membranes or the cytoplasm of cells, or of the entire cell.

In this talk, we describe some key questions behind the modeling of anomalous diffusion and the analysis of experimental data for nanoparticles in viscoelastic fluids. The discussion will revolve around the comparison between time and spectral domain perspectives on anomalous diffusion. We will discuss recent results and touch upon several research problems that await the attention of applied probabilists and statisticians.