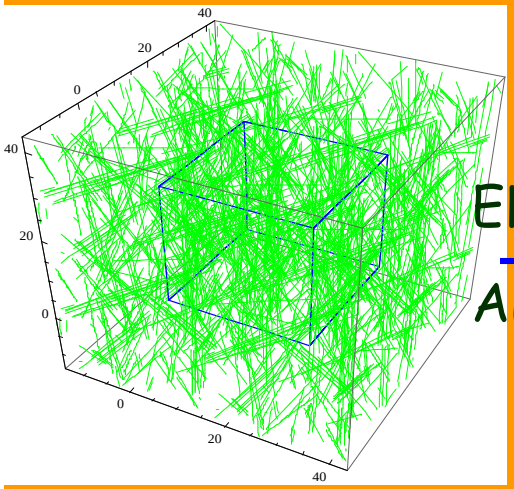
Dynamics of Ternary Polymer Blends

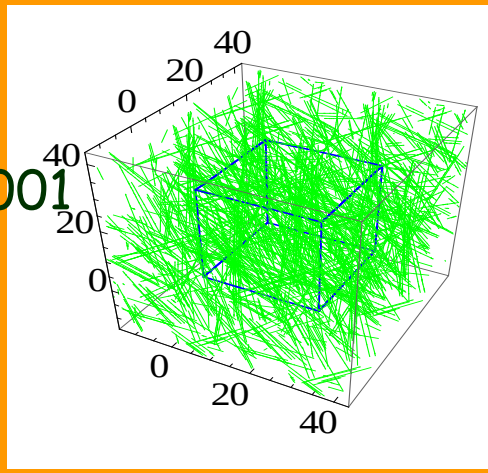
Prof. Venkat Ganesan, Department of Chemical Engineering,
The University of Texas at Austin, TX 78712.

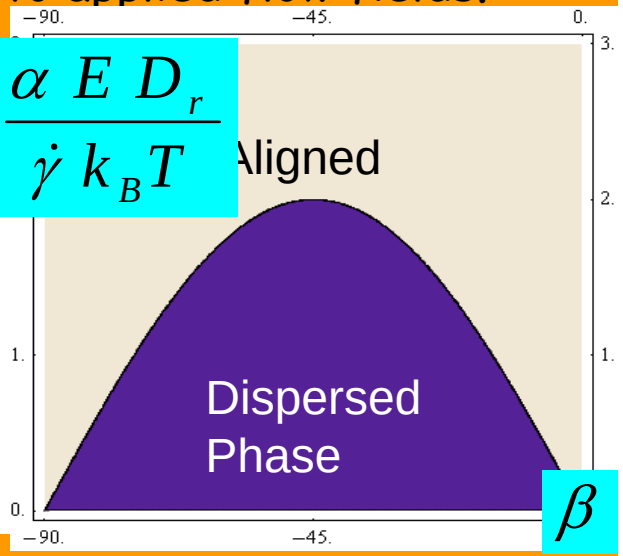
Many materials involving mixtures of polymers, surfactants, colloids exhibit novel flow behavior which couple to their structural characteristics leading to intriguing morphological transformations. The desirable properties of such materials are strongly correlated to the structure which results during (flow) processing, and hence understanding the mechanistic origins of their flow behavior proves crucial for realizing their applications. Motivated by such issues, we have successfully developed new simulation approaches and models which can predict the equilibrium structural characteristics as well as the response of such materials to applied flow fields.



EF =1;γ = 0.0001

Angle = 45





An example of a Brownian dynamics simulation illustrating the combined effect of flow and electric fields upon the structure of a mixture of polymers and nanorods. The results were quantified as a "phase diagram" delineating the regimes were such a protocol can be used as a means to disperse the nanorods.