Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Nonlinear Diffusion on a Sphere[1] XIAOYU ZHENG, Dept. of Mathematical Sciences, Kent State University, PETER PALFFY-MUHORAY, Liquid Crystal Institute, Kent State University — We are interested in describing orientation of non-spherical particles such as liquid crystal molecules, nanoparticles and colloidal particles due to interactions with each other and with external fields. Since the orientation of a rod-like particle corresponds to a point on a unit sphere, the time evolution of the orientational distribution function corresponds to nonlinear diffusion on a sphere. We use a direct cell-based method to solve the Smoluchowski equation describing the behavior. We construct the Voronoi tessellation on the sphere, and regularize it. We then use a finite volume method to compute the particle density in the cells. Numerical results show the time evolution of the orientational probability density function. These results can describe the behavior of nanorod suspensions in electric fields.

[1]This work was supported under NSF DMS-0908470.

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Date submitted: 16 Nov 2011 Electronic form version 1.4