Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Nano Liquid Crystal Droplet Impact on Solid Surfaces RUI ZHANG, JUAN DE PABLO, University of Chicago, DEPABLO TEAM — Liquid droplet impaction on solid surfaces is an important problem with a wide range of applications in everyday life. Liquid crystals (LCs) are anisotropic liquids whose internal structure gives rise to rich optical and morphological phenomena. In this work we study the liquid crystal droplet impaction on solid surfaces by molecular dynamics simulations. We employ a widely used Gay-Berne model to describe the elongated liquid crystal molecules and their interactions. Our work shows that, in contrast to isotropic liquids, drop deformation is symmetric unless an instability kicks in, in which case a nano scale liquid crystal droplet exhibits distinct anisotropic spreading modes that do not occur in simple liquids. The drop prefers spreading along the low viscosity direction, but inertia can in some cases overcome that bias. The effects of the director field of the droplet, preferred anchoring direction and the anchoring strength of the wall are investigated. Large scale (0.1 micron) simulations are performed to connect our nano scale results to the experiments. Our studies indicate that LCs could provide an interesting alternative for development of next-generation printing inks.

Rui Zhang
University of Chicago

Date submitted: 14 Nov 2014 Electronic form version 1.4