

On the non-equilibrium phase behavior of rod-like viruses under shear

P. Lettinga

Institut für Festkörperforschung, Forschungszentrum Jülich, 52425 Jülich, Germany

p.lettinga@fz-juelich.de

We study the non-equilibrium phase diagram of rod-like fd-virus under shear flow in a couette geometry. In the equilibrium system we observe three distinctive regions: the isotropic region at low rod concentrations, the nematic region at high rod concentrations and a coexistence of these phases at intermediate concentrations. The non-equilibrium phase diagram we present consists of a binodal, describing the transition from the bi-phasic region into the fully nematic phase at high enough shear rates, and of a region where the formation of shear bands is observed. First, we discuss the experiments we use to access the binodal. Next we discuss the features of the shear bands, which are stacked in the vorticity direction and can be as thick as 2 millimeters. We will show that the shear band formation is strictly connected to the bi-phasic region.