



Campagne doctorat international 2013

Résumé du projet

Self-organization and functionalization of model system of nanoparticles: the fd viruses



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Self-organization and functionalization of model system of nanoparticles: the fd viruses

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Dispersions of colloidal rods exhibit a cascade of phase transition by increasing the concentration of particles, from randomly oriented and positioned to 3D crystalline packing. Filamentous viruses are the only model system in which all these phases can be observed and where particle interactions of these very fundamental transitions can be monitored. The dynamic signature of the isotropic to nematic has been identified and also the anomalous dynamics within the smectic and columnar phases. The first basic goal of this project is to identify the dynamical signatures of nematic-smectic and smectic-columnar transition using fast and sensitive cameras to study the very local time-and length scales. The second one is to study the stability and deformability of the smectic phase by introducing alien substances(DNA coils, quantum dots etc...) in this ordered mesophase. Finally, this study aims to control the process of self-assembly and dis-assembly of the viruses by modifying them with thermo sensitive polymers and tuning the temperature.