



سمینار هفتگی گروه ماده چگال نرم

## **Colloidal interactions with tangential surface anchorings in the nematic liquid crystals**

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Colloidal particles in anisotropic host fluids such as liquid crystals solvent have a variety of industrial applications in paints, drugs, pasty foods and so on. The boundary conditions on surface of the colloidal particles change uniform the director profile at the nematic bulk limit in close to the particles. This treatment is as a result of the elastic distortions of the liquid crystal host. The combination of the geometry and the boundary conditions impose topological constraints which must be satisfied by the director field of the liquid crystal; this can lead to the formation of defect. These topological defects play a crucial role in determining the elastic interactions between colloidal particles suspended in a liquid crystal host. The defects are characterized by topological charges where is main factor in colloidal interactions that in analogical with electrostatic have dipolar and quadrupolar interactions. We want to use continuum Landau-de Gennes theory in mean field approach to describe the director behavior at the bulk limit, use Frank elastic energy in tensorial picture to study distortions of the nematic director in around of the particles, and use surface energy with multiple tangential degenerate anchorings on the colloidal surfaces. Numerical calculations have been done by using finite element method at two and three dimensions, and use standard conjugate-gradient optimization method to minimize free energy.

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