

Tuesday, March 30, 2:30 pm

Speaker: Prof. Linda Reven

Institution: McGill University

Title: Liquid Crystal Nanocomposites

Abstract: Liquid crystals, (LCs) the “fourth state of matter”, are ubiquitous in our daily lives as the basis for our display screens and in biological structures such as cell walls and the packing of DNA in bacteria. Liquid crystals are a fascinating field of soft matter physics due to the huge variety of structures and their dynamic response to electric and magnetic fields, temperature, mechanical strain and other external stimuli. The phases of lyotropic LCs, prevalent in biology, depend on concentration whereas thermotropic LCs, widely used for display applications, change structure in response to temperature.

We will first look at the anisotropic building blocks of these ordered fluids called mesogens that can be rod or disk shaped molecules, nanoparticles or polymers and the associated LC phases. Then we will examine how the degree of ordering is described and quantitated by imaging and spectroscopic methods. After covering these LC fundamentals, the emerging field of LC nanocomposites formed by adding nanoparticles to LCs will be described. Lastly I will present our recent work on the lyotropic phases formed by nanoparticles decorated with rigid rod helical polymers and the reversible assembly of nanoparticles into giant cubic lattices by a special class of chiral LCs known as “blue phases” that are natural photonics crystals.