

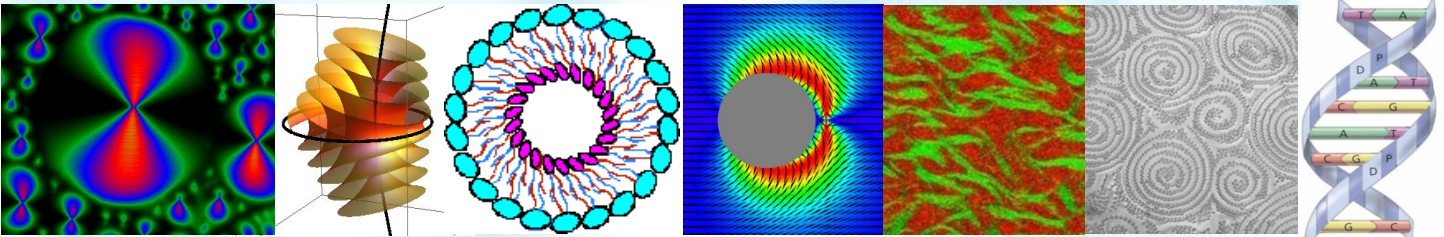
*Graduate Course Phys 7810-003, Spring 2009*

# ***Soft Condensed Matter***

*Instructor: Prof. Ivan I. Smalyukh, Department of Physics*

## ***Physics of Soft Materials Focus Topics***

- ***Organizing principles and structural properties***
  - *Phase transitions: theory and phenomenology*
  - *Interactions: forces, self-assembly, gelation*
  - *Dynamics: rheology and microrheology*
  - *Response to fields: dielectrics, diamagnetics, and ferroelectrics*
- ***Polymers***
  - *Block copolymers*
  - *Biopolymers*
  - *Crystalline polymers*
- ***Liquid crystals and plastic crystals***
  - *Onsager and Maier-Saupe theories of orientational order*
  - *Elasticity*
  - *Defects and topology: dislocations, disclinations, & point defects*
  - *Electro-optic and magneto-optic effects*
- ***Interfaces***
  - *Molecular monolayers*
  - *Biological membranes*
- ***Nano- and micro- structured materials***
  - *Composite metamaterials and mesoporous materials*
  - *Nanoparticle suspensions, emulsions, and stability of colloids*
- ***Applications***
  - *Renewable energy, electro-optics, and displays*



## ***Course Features and General Information***

- *Guest Lectures by Soft Matter Center Senior Investigators;*
- *Real-time webcast and lecture video-archives;*
- *Hands-on experience in the Soft Matter Center's labs;*
- *SMSAT and LCSAT Graduate Program Certificates;*
- *This is a 3-credit hour course;*
- *When: Tuesdays and Thursdays, 11:00 AM - 12:15 PM;*
- *Where: Duane Physics- G1B25.*