

**ESI SENIOR RESEARCH FELLOW  
LECTURE COURSE  
Summer Term 2022**

The Erwin Schrödinger International Institute for Mathematics and Physics (ESI) of the University of Vienna offers the following Lecture Course held by a Senior Research Fellow in residence during the Summer Term 2022:

**Classical Density Functional Theory with applications to colloid/polymer systems in the bulk and under confinement**

**Sergei A. Egorov (Virginia U)**

**Lecture Course (260060 VO): May 11 - June 22, 2022**

**Time:** 9:45 - 11:15

**Start:** Wednesday, May 11, 2022

**Further dates:** Wednesdays, May 18, May 25, June 1, June 8, June 15, June 22, 2022

**End:** Wednesday, June 22, 2022

**Venue:** Erwin Schrödinger Institute, Schrödinger Lecture Hall

**Content of the lecture course:**

Week 1: Fundamentals of Classical Density Functional Theory.

Week 2: Simple Applications: Hard Spheres, Fundamental Measure Theory, Asakura-Oosawa model of Colloid-Polymer Mixtures.

Week 3: Beyond Hard Spheres: Classical Density Functional Theory of Polymeric Molecules at a Monomer-resolved Level.

Week 4: Beyond Hard Spheres: Classical Density Functional Theory of Liquid Crystals, Isotropic-Nematic Transition.

Week 5: Dynamics: Langevin, Fokker-Planck, and Smoluchowski Equations.

Week 6: Dynamics: Time-Dependent Density Functional Theory and Mode- Coupling Theory.

Week 7: Advanced Topics: Crystallization and Freezing.

**Aims for the course:**

Understanding of the principles and the practical aspects of Density Functional Theory for inhomogeneous simple and complex fluids as well as its applications on problems such as wetting and confined fluids.

For more information please visit the ESI website: <https://www.esi.ac.at/events/e433/>

Christoph Dellago  
Director