

**June, 10th 2026**  
**11:15 a.m. - 12:00 a.m.**

**Referee:** Prof. Alexey Eremin | Department of  
Nonlinear Phenomena, Institute of Physics

**Where:** Building 09 - 211

## ***Emerging multifunctionality in self-assembled soft nanostructured polar media***

*Soft matter offers productive routes to **adaptive and multifunctional materials** because structure, dynamics, and response are often generated collectively rather than imposed externally. In liquid crystals, polymers, and colloidal assemblies, **self-organization** commonly produces partially ordered states in which orientational, positional, polar, and magnetic degrees of freedom are **strongly coupled**.*

*In this talk, I will discuss how such couplings can serve as a **design principle** for soft materials with **tunable, multiple responsivities**. I will focus on recently discovered **vector-symmetry fluids**, in particular **ferroelectric and ferromagnetic nematics**, where polarity or magnetisation coexists with fluidity. This unusual combination gives rise to **nonlinear feedback** between fields, order, and flows, leading to phenomena such as electrostatic stiffening, superscreening, field-guiding, fibre formation, and the stabilisation of **nontrivial topological states**.*

*I will also show how **nanoparticle-liquid-crystal hybrids** provide a route toward combining electrostatic and magnetic responses in **multiferroic fluids**. Beyond individual examples, the talk will emphasise a broader perspective: self-assembled polar soft matter as a platform for **programming emergent function** through coupled order parameters, feedback mechanisms, and controllable dynamic response.*