# DY 49: Talk J. Lagerwall

Time: Wednesday 15:00–15:30 Location: BH-N 334

**Invited Talk** DY 49.1 Wed 15:00 BH-N 334

**Nanorod fractionation via lyotropic liquid crystal formation, and its effect on phase diagram and gelation** — Camila Honorato-Rios[1], Claudius Lehr[1], Christina Schütz[1], Roland Sanctuary[1], Mikhail Osipov[2], Jörg Baller[1], and •Jan Lagerwall[1] — [1]University of Luxembourg, Physics and Materials Science Research Unit, Luxembourg — [2]University of Strathclyde, Mathematics & Statistics, Glasgow, Scotland (UK)

Colloidal nanorod suspensions of sufficient volume fraction may undergo two characteristic macroscopic phenomena, both related to the nanorod shape. On the one hand, the rods may spontaneously develop long-range order, i.e., they form a nematic liquid crystal phase. In case of length-disperse suspensions at phase coexistence, the higher aspect ratio rods preferentially go to the nematic fraction. On the other hand, connectivity percolation between rods may take place and the macroscopic sample arrests into a gel phase. The threshold for both phenomena decreases with increasing rod aspect ratio. We use the spontaneous fractionation by rod aspect ratio upon liquid crystal formation, repeatedly, to separate cellulose nanocrystals by length. Interestingly, an increased aspect ratio strongly benefits liquid crystal formation, but it has no impact on gelation. We argue that the critical factor for the gelation is not the physical rod aspect ratio but rather the amount of counter ions in solution. Above threshold the rods aggregate in an aligned manner, forming 'suprarods' that reach the required length for percolation, triggering the macroscopic gelation.