



Contribution ID: 519

Type: **Plenary (only invited by ECNS team!)**

Disclosing the unknown deep inside biomembranes

Thursday 23 March 2023 09:45 (45 minutes)

Cell membranes are complex objects made by several different molecular species. One of their most significant complexities is compositional asymmetry, key factor claimed to be associated to functional and structural roles. Nonetheless, membranes asymmetry is often hard to be reproduced in mimics. Experimental models, bearing forced membrane leaflets asymmetry in the form of dispersed aggregates in solution or of single supported bilayers, have been developed to be suitably investigated by complementary techniques such as scattering and reflectometry of neutrons and X-rays and calorimetry, to link their thermotropic behavior to their structuring on both the colloidal and the local scale in different environments. The possibility to create and study customized systems mimicking different cell membrane portions is indeed the way to the detailed structural investigation of a variety of specific molecule-membrane interactions, being also potentially predictive of the fate of extracellular bodies, macromolecules and nanodrugs intended to cross the extracellular medium and eventually enter cells.

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Session Classification: Plenary

Track Classification: Soft Condensed Matter