



Univerza v Mariboru

Fakulteta za naravoslovje in
matematiko

ODDELEK ZA FIZIKO FNM UM VABI NA PREDAVANJE

Magnetic liquid crystal colloids: history, theory and practice

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Focal conic texture of a smectic liquid crystal seen between crossed polarisers

Liquid crystals align along (or depending on the properties of the molecules involved, sometimes perpendicular to) magnetic and electric fields. The key property of liquid crystals which enables their use in devices is the so-called Frederiks effect. This involves the existence of a threshold field in a cell at which the liquid crystal alignment switches from that dictated by the walls of the cell to that dictated by the applied magnetic or electric field. In devices, this is an electric field, and the critical voltage is of the order of a volt. The equivalent magnetic field is enormous, and magnetic switching in

devices is impracticable. In 1970 the future Nobel prize winner Pierre-Gilles de Gennes suggested that the Frederiks threshold magnetic field could be massively reduced if magnetic colloid particles were added to the liquid crystal. Under such circumstances magnetic liquid crystal devices might become practical. In this talk I shall explore this idea, and discuss recent theoretical and experimental work on what have come to be known as "ferronematic" systems..

Predavanje (v angleškem jeziku) bo v petek 16. decembra 2011 ob 13h v predavalnici 0/46.2 Oddelka za fiziko, Fakultete za naravoslovje in matematiko Univerze v Mariboru, Koroška 160, 2000 Maribor

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