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MagnetoOptic Effects in Ferrofluids CORNELIU RABLAU, Kettering University, PREM VAISHNAVA, JONATHAN ZEIDERS, Kettering University, RONALD TACKET, RONALD KUMON, Kettering University — Ferrofluids are stable colloidal suspensions of superparamagnetic nanoparticles in a carrier liquid. The ordering and phase transitions of these polarizable media under the effect of an externally applied magnetic field are accompanied by a number of magneto-optic effects such as the Faraday Effect, dichroism and birefringence. However, the investigation of such effects is complicated by the time-dependent behavior of light propagation and scattering through the ferrofluid at the OFF-ON and ON-OFF transients of the magnetic field. In this presentation we report studies of these transients in a number of ferrofluid systems and discuss the correlation between the light-scattering signature pattern and the ordering of nanoparticles in the ferrofluid. In particular we address the origin of a circular pattern produced by light scattered through a thin layer of ferrofluid and contrast it with the patterns produced by longer light paths through the ferrofluid.

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