

**TITLE:** **Controlling Magnetism with Light**

**SPEAKER:** **Theo Rasing**  
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**DATE:** Wednesday, June 3, 2009

**TIME:** Reception: 3:30 PM – Presentation: 4:00 PM

**PLACE:** Auditorium – Center for Magnetic Recording Research

**HOST:** Prof. Paul H. Siegel

The interaction of light with magnetic matter is well known: magneto optical Faraday or Kerr effects are frequently used to probe the magnetic state of materials, or manipulate the polarisation of light. The inverse effects are less known but certainly as fascinating: with light one can manipulate magnetic matter, for example orient their spins. Using femtosecond laser pulses we have recently demonstrated that one can generate ultrashort and very strong (~Tesla's) magnetic field pulses via the so called Inverse Faraday Effect. Such optically induced magnetic field pulses provide unprecedented means for the generation, manipulation and coherent control of magnetic order on very short time scales, including the complete reversal of a magnet with a single 40 femtosecond laser pulse. In principle this opens the way for all-optical recording of magnetic bits at extremely high data rates. The basic ideas, including their limitations, behind these discoveries will be discussed and illustrated with recent results.



**Theo Rasing** (26 May 1953, Didam) obtained his degree in physics (cum laude) from the Radboud University Nijmegen in 1976, where he also gained his doctorate in 1982. After postdoctoral stays at UC Berkeley (IBM fellowship) he became staff scientist and deputy program leader at the Lawrence Berkeley Laboratory, where he developed nonlinear optical techniques for surface and interface studies. In 1988 he was appointed associate and in 1997 full professor of physics in Nijmegen. He is the founder and director of the Nijmegen Centre for Advanced Spectroscopy (NCAS), member of the board of the Dutch NanoNed and founder of NanoLab Nijmegen that makes its expertise and infrastructure available to the commercial sector. In 2007 he received the Physica Prize from the Netherlands Physical Society and in 2008 he received the Spinoza price, the highest scientific award from the Netherlands Organisation for Scientific Research NWO. To date, his research has yielded more than 300 publications in international journals, including Nature, Science and Physical

Review Letters. He is also the initiator and coordinator of various large national and international partnership programmes.

Theo Rasing is a pioneer in the development of new linear and nonlinear optical techniques for studying and manipulating molecules and materials with an emphasis on nanometer length and femtosecond time scales. His research is mostly focused on the static and dynamic properties of magnetic nanostructures and multilayers. For this he developed the technique of Magnetization induced Second Harmonic Generation and various ultra sensitive pump-probe methods. His most recent and most successful research in the field of spin dynamics is that into the manipulation of magnetism using light.

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If you have any questions or want to meet with the speaker before the seminar, contact Betty Manoulian ([bmanoulian@ucsd.edu](mailto:bmanoulian@ucsd.edu) / Phone 858-534-6707).