



# Colloquium

**June 21st, 2010 - 15:00 pm**

**FLASH HALL, Sem. Room, DESY Bldg. 28c**

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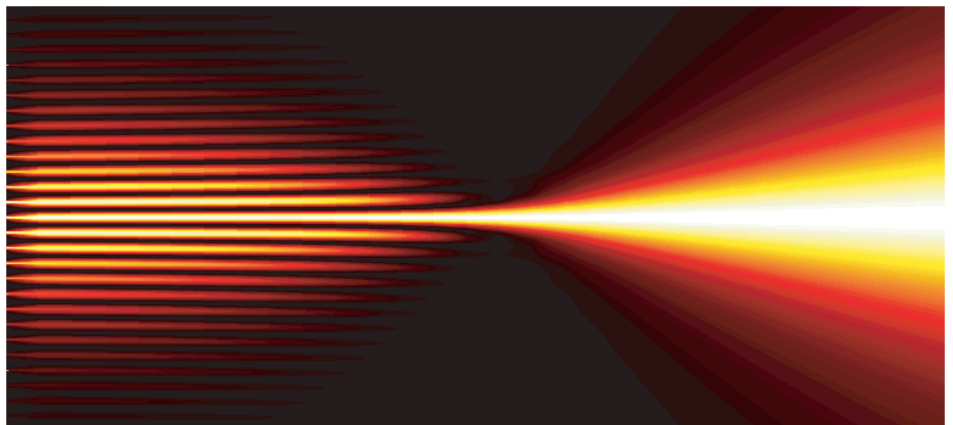
## Negative Refraction and Radiationless Interference: The Quest for the Superlens

The talk will take us from the late 1800's, when Abbe published his ground-breaking paper on the limit of resolution of an optical instrument, to the turn of the 20th century, when the field of near-field optics experienced tremendous growth, emphasizing recent work on sub-wavelength focusing using negative-index slabs [1]. In the second half of the talk, we will introduce the concept of near-field plates [2]. These are grating-like planar structures which provide focusing well beyond the diffraction limit, at arbitrary frequencies. The subwavelength electromagnetic-field distributions of the plates closely resemble those of negative-index slabs. Practical implementations of these plates hold promise for near-field data storage, non-contact sensing, imaging, nanolithography and wireless power transfer applications. Experimental results on a microwave near-field plate will be presented, which demonstrate focusing of 1 GHz radiation at a resolution of  $\lambda/20$  [3].

[1] J. B. Pendry, Phys. Rev. Lett. 85, 3966 (2000)

[2] R. Merlin, Science 317, 927 (2007); A. Grbic and R. Merlin, IEEE Trans. Antennas Propag. 56, 3159 (2008).

[3] A. Grbic, L. Jiang and R. Merlin, Science 320, 511 (2008).



Host: Andrea Cavalleri, MPD / CFEL