

応用物理学会北海道支部
会員各位 殿

平成15年10月7日

講演会のお知らせ

下記により講演会を開催致しますので、多数ご参加下さいますようご案内申し上げます。

記

演題 Chameleon Metals: Photonic Nanostructures from Self-Assembly
講師 Jeremy J. Baumberg 氏
(University of Southampton, Professor)
日時 平成15年10月21日(火) 16:30~17:30
場所 北海道大学大学院工学研究科 量子物理工学専攻会議室 A3-62
後援 応用物理学会北海道支部

講演の要旨

The familiar experience of light bouncing off a metal mirror is given a radically new twist when metal films are patterned on the nanometre scale. By essentially performing "lost-wax" casting using arrays of sub-micron objects as a template, we create simply and cheaply a whole array of intricate 3D metal and semiconductor nano-architectures on large area robust films. Since the spherical voids created are on the scale of the wavelength of light, their properties go beyond familiar optics. We find a very wide range of new optical phenomenon in these structures, including novel interference inside a single sub-micron void, localised plasmons trapped in the voids, and plasmonic bandgaps on the textured surfaces. Using such nanophotonic structures, we have recently made resonant optical cavities with ultrasmall mode volumes, suitable for a wide range of applications such as molecular sensing, optical trapping, microlasers and the ultimate goal of single chromophore-single optical mode coupling [1-7].

- [1] "Preparation of arrays of isolated spherical cavities by self-assembly of polystyrene spheres on self-assembled pre-patterned macroporous films", M Abdelsalam, S Coyle, JJ Baumberg, PN Bartlett, Adv. Mat. (2003).
- [2] "Tunable Resonant Optical MicroCavities by Templated Self-Assembly", GV Prakash, L Besombes, JJ Baumberg, M Abdelsalam, PN Bartlett, submitted to Phys.Rev.Lett. (2003).
- [3] "Spherical Micro-Mirrors from Templated Self-Assembly: Geometric Reflectivity on the Micron Scale", S Coyle, GV Prakash, JJ Baumberg, M Abdelsalam, PN Bartlett, Appl. Phys. Lett. 83, 767 (2003).
- [4] "Optical properties of nanostructured metal films", Bartlett PN, Baumberg JJ, Coyle S, Abdelsalem M, Faraday Discussions 125, (2003)
- [5] "Highly ordered macroporous gold and platinum films formed by electrochemical deposition through templates assembled from submicron diameter monodisperse polystyrene spheres", Bartlett PN, Baumberg JJ, et al, Chemistry of Materials 14 (5): 2199-2208 (2002).
- [6] "Confined Plasmons in Metallic Nanocavities", S. Coyle, M.C. Netti, J.J. Baumberg, M.A Ghanem, P.R. Birkin, P.N. Bartlett, D.M. Whittaker, Phys. Rev. Lett. 87, 176801 (2001)

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