Physics > Optics

Magnetic light

Arseniy I. Kuznetsov (1), Andrey E. Miroshnichenko (2), Yuan Hsing Fu (1), JingBo Zhang (1), Boris Luk'yanchuk (1) ((1) Data Storage Institute, Singapore, (2) Nonlinear Physics Centre, CUDOS, Australian National University, Canberra, Australia)

(Submitted on 8 May 2012)

Spherical silicon nanoparticles with sizes of a few hundreds of nanometers represent a unique optical system. According to theoretical predictions based on Mie theory they can exhibit strong magnetic resonances in the visible spectral range. The basic mechanism of excitation of such modes inside the nanoparticles is very similar to that of split-ring resonators, but with one important difference that silicon nanoparticles have much smaller losses and are able to shift the magnetic resonance wavelength down to visible frequencies. We experimentally demonstrate for the first time that these nanoparticles have strong magnetic dipole resonance, which can be continuously tuned throughout the whole visible spectrum varying particle size and visually observed by means of dark-field optical microscopy. These optical systems open up new perspectives for fabrication of low-loss optical metamaterials and nanophotonic devices.

Comments:	24 pages with 6 figures
Subjects:	**Optics (physics.optics)**
Journal reference:	Sci. Rep. 2 (2012), 492
DOI:	10.1038/srep00492
Cite as:	**arXiv:1205.1610 [physics.optics]**
	(or **arXiv:1205.1610v1 [physics.optics]** for this version)

Submission history

From: Arseniy Kuznetsov [view email]
[v1] Tue, 8 May 2012 07:26:24 GMT (455kb)

Which authors of this paper are endorsers?