Seminar/Talk

Energy transport and topological aspects of collective plasmons in chains of metallic nanoparticles

Charles A. Downing
Université de Strasbourg

Host: Mikhail Lemeshko

One of the primary goals of plasmonics is to confine light at subwavelength scales. This aim is motivated by the desire to both transport and manipulate light over macroscopic distances. While metallic nanostructures have been proposed and widely studied to achieve such 'plasmonic circuits', both radiative and nonradiative losses inherent to metals are rather significant. Hence, the possible applications for energy and information transport at the nanoscale are seemingly limited. Understanding the different damping mechanisms in radiatively-coupled metallic nanostructures is thus of paramount importance to the field of plasmonics, from both a fundamental point of view and in order to increase the efficiency of signal transmission.

We investigate the collective plasmonic modes in chains of spherical metallic nanoparticles that are coupled by near-field interactions. These dipolar interactions between the nanoparticles gives rise to collective plasmons, which are extended over the whole plasmonic lattice. We study both a simple chain composed of regularly-spaced nanoparticles [1] and a bipartite chain, which exhibits nontrivial topological features and novel excitations, namely massive Dirac bosons [2].

[1] A. Brandstetter-Kunc, G. Weick, C. A. Downing, D. Weinmann, R. A. Jalabert, Nonradiative limitations to plasmon propagation in chains of metallic nanoparticles, Phys. Rev. B 94, 205432 (2016)

[2] C. A. Downing and G. Weick, Topological collective plasmons in bipartite chains of metallic nanoparticles (submitted to Phys. Rev. B).

Monday, February 20, 2017 11:00am - 01:00pm

Seminar room Big Ground floor / Office Bldg West (I21.EG.101)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.