An atom/surface Metamaterial Hybrid device

By

Assoc Prof David Wilkowski
Nanyang Technological University

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Host: Assoc Prof Phan Anh Tuan

Abstract

Since a long time spectral properties of free atoms have been seen as a test bench of physical theories. However, these properties are modified if atoms are located in the close proximity of an interface. In this respect, we have recently studied the optical response of a caesium atomic vapour at the proximity of a nanostructured metallic meta-surface. We find that the hyperfine sub-Doppler spectrum of the atoms is strongly affected by the plasmonic resonances induced by the metamaterial. We interpret the modifications of the atomic spectrum using a mean field approach, where the metamaterial is replaced by an effective quasi 2D bulk material having the same far-field optical properties. It turns out that the Van der Waals interaction shows a resonance-like behaviour as function of the relative position of the plasmonic resonance with respect to the atomic resonance.

Short Biography

David Wilkowski is an associate professor at the University of Nice since 1999. In 2011, he jointed NTU as a visiting Assoc. prof. where he's developing scientific activities around ultracold gases and atoms/metamaterial hybrid devices.

http://www.spms.ntu.edu.sg/pap/Home/Faculty/David_Wilkowski.html