

*Seminar lecture in the framework of International
doctoral school in Science*

Opto-Thermo-Mechanic effects in nanopillars studied with Finite Element Method

Introduce:

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Interviene:

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Abstract

The study of light-nanostructures interaction involves a large number of physical phenomena, including temperature increase, thermal expansion, acoustic wave generation and phase-changes. All those phenomena are interconnected and can be studied by means of finite element method (FEM). In this seminar the opto-thermo-mechanic effect of a LASER on a single nanopillar (NP) will be analyzed, both in the continuous wave (CW) and in the pulsed regime. In the CW regime, an amorphous silicon NP is heated with a focalized laser source, triggering a conversion from the amorphous to the crystalline phase. With FEM we can analyze the mechanical stress and evaluate the strain induced by thermal expansion and by the density difference between the two phases. In the pulsed regime a pillar of InAs is excited with femtosecond laser pulse. Pump-probe measurements of the reflectivity show the presence of periodic oscillations, which can be ascribed to the excitation of acoustic vibrations in the pillar. FEM simulations can clarify the mechanism of excitation and evaluate the oscillation frequencies, which are in excellent agreement with experimental results.

Seminario

Martedì 26 marzo 2019
Sala Riunioni, ore 14.00
Via dei Musei 41 - Brescia

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