

## Nonlinear dynamics of microbeam resonators under periodical and pulse opto-thermal excitations

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*Abstract:* The principle of laser thermo-optical exposure to a deformable medium is increasingly used in the tasks of non-destructive testing of equipment and structures, determining the physicomaterial properties of materials, studying the geometric and physical parameters of objects and structures at the nano- and microscale level, in biomedicine, as well as in the industry of nano and microsystems. One of the important directions of development and research in this area is laser thermo-optical generation of oscillations of moving elements of microelectromechanical systems for various purposes (sensors, signal processing systems). This work is devoted to the construction and study of mathematical models of the dynamics of a micromechanical beam resonator under pulsed and periodic localized thermo-optical action. The considered model of the resonator is based on the laser thermo-optical principle of generating bending oscillations of a beam-like movable element and the electrostatic principle of detecting the output signal. Nonlinear resonator dynamics under opto-thermal excitations is investigated using asymptotic methods of nonlinear mechanics, finite difference and finite element methods with account for the coupling of longitudinal and transverse motions.

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