

## **Multiphysics simulations for phase change material based nanophotonics**

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### **Abstract**

The growing demand on reconfigurability in neuromorphic computing, quantum computing and microwave photonics is attracting increasing attention towards design and optimization of active integrated photonic components. Phase change materials are materials in which phase transitions can be induced quickly and reversibly, resulting in pronounced changes of their physical properties. Phase change materials are becoming increasingly popular element of photonic components for manipulation of light. By changing a phase of the material near a localized electromagnetic element, being a part of an electronic or optoelectronic component or a functional element of a metamaterial, it is possible to realize non-volatile, reconfigurable, time dependent and (re)programmable functionality. Due to a drastic change of the material properties during the phase transition resulting in the time-dependent changes in the absorption rate and heat conduction near the switched element, one has to describe electromagnetic, thermal and phase transition processes in a self-consistent manner. In this presentation we report on recent developments and applications of a multiphysics description of phase change material based nanophotonic systems.