Titel des Beitrags:
Modeling and simulation of In 1-x GaAs x nanowire solar cells

Abstract:
In this paper, we investigate the electrical and optical properties of novel InGaAs nanowire solar cells. Key features like high optical absorption and excellent charge carrier mobility make them an attractive candidate to established solar cell technologies. The aim of our study is gain a deeper understanding of the underlying physics involved and to identify the limiting factors in the device under study. We perform a detailed simulation study of a fabricated nanowire structure under typical illumination conditions, extracting key figures of merit like efficiency, short-circuit current and open circuit voltage; our values are in good agreement with recently reported nanowire solar cells. After having validated our simulation approach, different optimization techniques are investigated in order to maximize the performance of the solar cell.

Stichworte:
III-V semiconductors, carrier mobility, electric properties, gallium arsenide, indium compounds, light absorption, nanowires, optical properties, solar cells, Intextsubscript1-xGa Astextsubscriptx, charge carrier mobility, electrical properties, figure of merit, high optical absorption, illumination conditions, nanowire solar cell
modelling, nanowire solar cell simulation, nanowire structure, open circuit voltage, optical properties, optimization techniques, short-circuit current, III-V semiconductor materials, Integrated circuit modeling, Junctions, Mathematical model, Optical device fabrication, Photovoltaic cells, Silicon, modeling, nanowire, numerical simulation, radial junction, solar cell