

## Speaker Abstracts Karlsruhe Days of Optics & Photonics



**Prof. Dr. Ralph Krupke**

Institute of Nanotechnology  
(INT), KIT

### **Light emission from electrically driven carbon nanotubes**

Our work is motivated by recent efforts to use light as carrier of information for on-chip data transmission. Whereas photonic chips are available, there appears to be a need for the development of nanoscale, electrically

driven light sources that can be seamlessly integrated into complex photonic structures. Carbon nanotubes could be part of a solution due to their unique electrical, optical and structural properties, and their use as on chip light sources integrated in optical waveguides and cavities was demonstrated [1,2]. But even though these results are promising, there are still unresolved issues in gaining full control on reliable and reproducible light emission. I will report on the current status and ongoing developments and show results from first low-temperature electroluminescence data measured with pristine nanotubes and nanotubes with defect induced deep exciton traps; the latter being of interest for the development of single-photon sources operating in the telecom band [3].

[1] Khasminskaya et al., Nature Photonics 10 (2016) 727–732

[2] Pyatkov et al., Nature Photonics 10 (2016) 420–427

[3] He et al., Nature Materials. 17 (2018) 663-670