

From atoms to black holes – With nanotechnology to next-level precision experiments

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Nanotechnology is crucial in realizing compact photonic systems for light routing and conditioning with ever more complex optical functions. It also promises to elevate the precision of experiments in high-precision optical metrology to an unprecedented level, e.g., optical atomic clocks and gravitational wave detectors - the most precise experiments ever developed by humankind. In this contribution, I give an overview of the development and possibilities of nanophotonic devices for applications in precision optical experiments. I explain relevant physical phenomena of light-matter interaction and illustrate the role of material properties in these experiments.