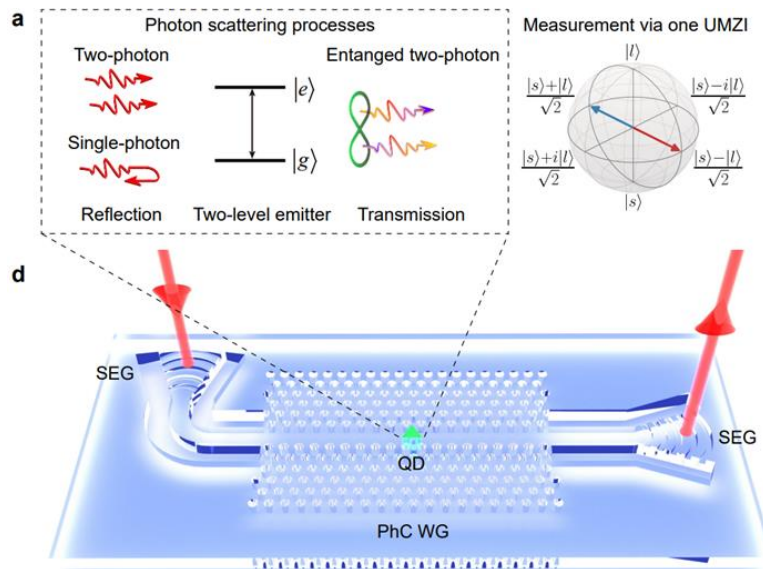


Highlights: Center for Hybrid Quantum Networks (Hy-Q)

Research highlights



Several major experimental breakthroughs have been realized within Hy-Q in 2023. This has been made possible by the unique collaboration between experiment and theory. We have realized a novel type of nonlinear interaction that is sensitive at the level of single photons – the fundamental constituent of light. The approach exploits a single solid-state atom (a so-called quantum dot) embedded in a nanophotonic chip (see illustration above) to mediate a giant photon-photon interaction. It was predicted and experimentally realized that entanglement could be created this way – the hallmark for quantum behavior. In our experiment we have demonstrated a “violation of the Bell inequality” thereby explicitly finding that a classical physics “local description” of the physical system does not suffice. The novel approach opens a range of exciting opportunities within quantum-information processing that will be the focus next.

Outreach

National and international awareness about quantum science is constantly being raised, and 2023 was no exception. Hy-Q was - as a leading quantum-science center - visited by many ambassadors and politicians, but also primary- and high school students and other interested people. Researchers from Hy-Q also appeared in several newspaper articles, podcasts, and TV-programmes, including Børsen, TV2 Go’ Aften Danmark, Weekendavisen, and the podcasts TechTopia, Indium, and All Things Photonics. Contributions to popular scientific journals were made to e.g. Physics World and Physics Today.