Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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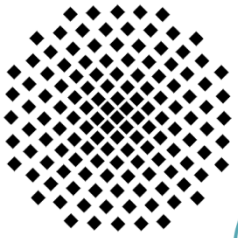

Dienstag, 18. Juni 2013	17:15 Uhr	Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Jörg Wrachtrup, Universität Stuttgart, Telefon: 0711 - 685-65278

How optical quantum computers can revolutionize cloud networks and outperform supercomputers

Philip Walther
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Abstract

The advantages of the photons makes optical quantum system ideally suited for a variety of applications in quantum information processing. Here I will review results for the realization of secure quantum cloud computing, where quantum information is communicated and computed. Remarkably such secure computing requires neither quantum memory nor any computational resource for the clients and thus might become important for real-life applications of quantum information technology especially when considering the tremendous challenges encountered in making quantum computers widely available.

Related to secure quantum networks I will also briefly discuss new experimental insights into the verification of quantum computing as well as the experimental comparison of different quantum resources. Finally, I will briefly review recent photonic quantum simulation experiments and present new results on resource-efficient intermediate quantum computing utilizing the Bosonic nature of photons.

As outlook I will discuss the current status of new quantum technology for improving the scalability of photonic quantum systems by using integrated circuits, superconducting single-photon detectors and tailored light-matter interactions.