

## Solving optimization problems with large-scale quantum / photonic circuits: the OPO Ising machine and beyond

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**10:30 am – 12:30 pm**

**Room: Falkenbrunnen, room 04/05, Chemnitzer Str. 50**

### **Abstract:**

There has been recent interest in solving hard computational problems with analog photonic hardware. I discuss a novel approach, based on the quantum phase transition in an optical parametric oscillator (OPO), to map NP-hard Ising problems onto the dynamics of a network of OPOs.

Recent work on OPO networks up to size  $N=10,000$  is highlighted, as well as proposals to realize the same phenomena in networks of CMOS-compatible silicon micro-rings.

### **Bio:**

Ryan Hamerly's interest in physics was sparked by a Tesla coil he built in high school. He graduated from Caltech in 2010 after researching black hole mergers with Prof. Yanbei Chen, and received a PhD from Stanford in 2016 for his work with Prof. Hideo Mabuchi on quantum control, photonic circuits and nonlinear optics. He currently works with Profs. Yoshi Yamamoto and Shoko Utsunomiya at the National Institute for Informatics in Japan.

