

## **NEXT LITE-SEMINAR**

### *Solving hard computational problems with coupled lasers*

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Date and Time: **Thursday, October 19<sup>th</sup> 2017, 14:00**

Location: **TU Wien, Institute of Solid State Electronics**

1040, Floragasse 7, 1<sup>st</sup> Floor, Seminar Room 362

Host: S. Rotter

#### **Abstract**

In past years there have been extensive efforts to solve hard computational problems by realizing physics systems that can simulate specific problems. Here we present a new method in which a modified degenerate cavity (MDC) is used to solve difficult computational tasks. As will be shown, the degenerate cavity possesses a huge number of degrees of freedom (300,000 modes in our system), that can be coupled and controlled. Specifically, the MDC allows direct access to both the x-space and k-space components of the lasing mode. Placing constraints on these components can be mapped to different computational minimization problems. Due to mode competition, the laser selects the mode with minimal loss and finds the solution. Details of our experimental system will be presented, as well as recent results demonstrating the ability to use the MDC for simulating XY spin systems and finding their ground state, for phase retrieval, for imaging through scattering medium and more.