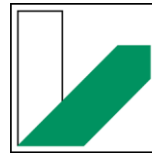


# Physikalisches Kolloquium



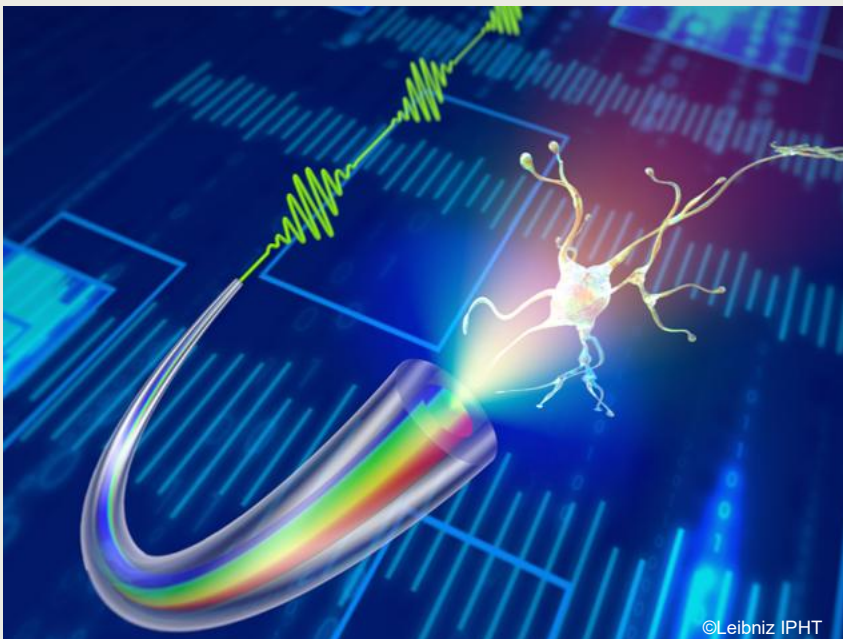
UNIVERSITÄT  
BAYREUTH  
Physikalisches Institut

Studierendenkolloquium

## **Towards Ultimate Nonlinear Kernel Machines From Nonlinear Mapping to Brain-Inspired Computing in Optical Fibers**

The current achievements in artificial intelligence are based on decades of progress in the understanding of artificial neural networks as trainable, non-linear learning systems. Decades of knowledge about complex-dynamic systems of physics could now offer a new starting point for intrinsically neuromorphic processors. The lecture sheds light on the basic principles of neural-like computing with nonlinear wave dynamics using current examples and deepens the principle using an experimental demonstration of the principle based on optical waves. In particular, it is shown that broadband frequency generation based on decay processes of optical pulses in a single fiber make it possible to imitate the classification and prediction functions of different optical networks. The technological potential of highly dynamic, physical systems as the basis of more energy-efficient computer hardware is up for discussion.

**Tuesday, 30<sup>th</sup> June 2026 | 5:00 pm | Lecture Hall H15 (NW I)**



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*Prof. Dr. Mario Chemnitz*  
FSU Jena

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