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Faculty of Physics

**Directorate of studies
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Physics**

<http://ssc-physik.univie.ac.at>

Univ.-Prof. Mag. Dr. Thomas Pichler
Boltzmanngasse 5, 1090 Vienna

Phone +43(1) 4277 51466
dspl.physics@univie.ac.at

To all members of the
Faculty of Physics

Vienna, 05 December 2025

Invitation to the public defense of the doctoral thesis

**“From Quantum to Classical: Coherence in Quantum
Networks, Dissipative Phase Transitions, and the Origins
of Classical Mechanics”**

by

Christin Schuster

Friday, 12 December 2025, 12:00 a.m.

Erwin-Schrödinger-Lecture Hall, 5th floor, Boltzmanngasse 5, 1090 Vienna

Carbyne is a truly one-dimensional nanomaterial, consisting of an infinitely long chain of carbon atoms, the sp^1 hybridized carbon allotrope with outstanding predicted mechanical, optical and electronic properties. However, carbyne is highly reactive and unstable, requiring some form of confinement to prevent exothermic collapse, which is best achieved by confining it inside CNTs, so called confined carbyne (CC).

A new method for bulk yield determination was developed and used to further optimize the synthesis parameters of CC. With improved understanding of the synthesis, the functionalization of CC using doped precursors was investigated, and the application of CC as a local contact-free temperature sensor was explored. It was confirmed that doped precursors are a suitable pathway to introduce hetero-atoms into carbyne chains and that optimized CC samples could be excellent candidates for thermometric application in the temperature region from 100 Kelvin to 300 Kelvin.

Defense committee:

Akos Kukovecz, University of Szeged, HU (reviewer)

Etienne Gaufres, IOA-Laboratoire Photonique Numérique et Nanosciences, FR (reviewer)

Thomas Pichler (supervisor)

Oliver H. Heckl (chair)