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Faculty of Physics

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To all members of the
Faculty of Physics

Vienna, 07 May 2024

Invitation to the public defense of the doctoral thesis

**“Gupta–Bleuler Quantization of the Electromagnetic Field
in Curved Space-Times with Applications to Gravitational
Photon Interferometry”**

by

Thomas Mieling

Tuesday, 14 May 2024, 09:00 a.m.
Seminarraum 9, OGO1, Kolingasse 14-16, 1090 Vienna

To study the interplay of gravity and quantum physics, experiments are under development that aim at measuring phase shifts induced by Earth’s gravitational field in single photons or entangled pairs of photons. The thesis presented here provides a comprehensive model of such experiments by formulating a theory of quantum optics in stationary space-times. This work combines general methods of field quantization in curved space-times with explicit perturbative calculations to provide concrete predictions for future experiments on quantum optics in the presence of external gravitational fields.

Defense committee:

Domenico Giulini, Leibnitz University of Hannover, DE (reviewer)

Timothy Ralph, University of Queensland, AU (reviewer)

Piotr Chrusciel (supervisor)

Philip Walther (supervisor)

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