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Einladung zum Vortrag

"Entropy and Quantum Information Processing"

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Termin: **Montag, 17.06.2019, 08:45 Uhr**, **Lehrprobe 09:30 Uhr**

Ort: **Kleiner Hörsaal 4 / HS 4, Währinger Straße 42, Halbstock**
Fakultät für Chemie

Abstract:
Entropy is a fundamental, multidisciplinary concept linking a priori unconnected areas of science such as statistical mechanics, thermodynamics, information theory, and computer science – well-understood in the case of classical systems. In contrast, when it comes to systems described by quantum mechanics, our knowledge about entropy is still very limited. The reason is that quantum states are entangled and the resulting non-commutativity poses a big challenge for lifting results from the classical to the quantum setting. Entropy inequalities that are known to hold in the non-commutative case, such as the strong subadditivity, give crucial insights into the entanglement structure of quantum states.
In my talk, I will prove refined quantum entropy inequalities based on multivariate trace inequalities that extend the Golden-Thompson and Araki-Lieb-Thirring inequalities to arbitrarily many matrices. I will present applications in quantum information processing: First, I will address the security analysis of quantum cryptographic protocols, and second, I will discuss quantum error correction schemes for intermediate scale quantum devices.

Im Rahmen des Vortrages findet eine Lehrprobe zum Thema „The concept of information in mathematics and physics" statt.