SONDERSEMINAR/SPECIAL SEMINAR
LMU/MPQ

am:	**Wednesday, November 28, 2012**
Uhrzeit:	**10 a.m. s.t.**
spricht:	**Dr. James McLoughlin** **Department of Physics & Astronomomy** **Pevensey II Building** **University of Sussex** **GB-Brighton** **BN1 9QH**
Thema:	**Towards Quantum Information Processing With Trapped Yb^+ Ions**
Ort:	**Audience Hall MPQ**

gez. Prof. T.W. Hänsch

Abstract

Towards Quantum Information Processing With Trapped Yb^+ Ions.

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Trapped ions are one of the most promising architectures for quantum information processing due to their long trapping times, excellent coherence properties, and exquisite control of internal energy states. In particular the $^{171}Yb^+$ ion is a very attractive candidate offering accessible transitions and a ground state hyperfine doublet ideal for qubit state representation.

I present the experimental setup utilised by the Ion Quantum Technology group to trap Yb^+ ions, and investigations towards Yb^+ based QIP. Since excessive ion energy can limit the coherence of laser-ion interactions the motional heating rate is first characterised, and shown to be consistent with expected trends. Single qubit operations fundamental for QIP, including state identification and qubit rotation, are then demonstrated. Finally schemes for multiple qubit systems are discussed.