

## SONDERSEMINAR

am: Freitag, 11.6.2010

Uhrzeit: 10:00 Uhr s.t.

spricht: Prof. Berge Englert  
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Titel: State Tomography and Entanglement Witnesses

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### Abstract

Symmetrical informationally complete probability operator measurements (SIC-POMs) enable neat and efficient state tomography -- in theory, that is. In practice, no one uses SIC-POMs for the tomography of qubit-pair states because it is so much easier to implement product POMs, with a POM for each of the qubits, possibly of the SIC kind. Perhaps it is worth the trouble to go for a full-blown SIC-POM nevertheless? The answer is: Hardly. But there is another use for SIC-POMs. They constitute a minimal set of entanglement witnesses that provide tomographically complete information, and thus answer a ten-year old question: How many witnesses need to be measured to decide whether an arbitrary state is entangled or not? The SIC-POM answer is: As many as the dimension of the state space. With a clever use of the data acquired when measuring a witness, however, the number of witnesses can be reduced by much. I will describe how just that can be done quite easily with existing linear-optics technology for two polarization qubits.

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