



## Christof Wunderlich (Universität Siegen)

### Building blocks for laser-less quantum information science with trapped ions

Laser cooled atomic ions confined in an electrodynamic cage have been very successfully used for quantum information processing. Here, we report on experiments that demonstrate building blocks for a scalable quantum processor or quantum simulator. In particular, laser-less addressing and spin-motion coupling (prerequisite for conditional quantum dynamics with trapped ions) has been demonstrated for the first time. Furthermore, error-resistant quantum gates based on optimal control theory and the engineering and complete tomography of single-qubit quantum channels will be reported. Novel micro-structured ion traps novel allow for creating 2-dimensional ionic cluster states solely by switching of voltages and currents.

27. November 2009, 14:00 Uhr

Universität Ulm, Raum N24 / H13  
Albert-Einstein-Allee 11, 89081 Ulm

