



**18. January 2012 - 15:00**  
**FLASH HALL, Seminar Room (28c)**

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## **Immanuel Bloch**

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### **Observing and Controlling Quantum Matter at the Single Atom Level**

The realization of ultracold quantum gases at Nanokelvin temperatures has marked a milestone in modern quantum physics. With the help of laser light, these ultracold atom clouds can be stored in artificial periodic potentials created by laser light - so called optical lattices - that allow us to explore fundamental aspects of strongly interacting fermionic and bosonic quantum matter. In very recent experiments, we have been able to record single snapshots of a quantum fluid in which individual atoms are detected with single lattice site resolution. These open unprecedented novel opportunities for analyzing and manipulating strongly interacting quantum system. In my talk, I will review some of the recent experiments on strongly correlated quantum gases in optical lattices and highlight connections to condensed matter physics, quantum information science and atomic- and molecular physics.

