SFB Meeting October 13./14. 2011

Thursday, 13.10.2011

14:00	25+5	14:30	Group F.Ferlaino	A.Frisch	*A narrow-line Er MOT: a simple approach for a complex atom*
14:30	25+5	15:00	Group M.Arndt	T.Juffmann	*Single molecule fluorescence detection of far-field interferograms*
15:00	35	15:35	Coffee Break		
15:35	60+10	16:45	Invited talk	J.Freericks	*A condensed matter physicist's journey into ultracold atomic physics: from ion trap quantum computation to mixtures of ultracold atomic gases in optical lattices*
16:45	25+5	17:15	Group R.Blatt	Daniel Nigg	*Experimental characterization of quantum dynamics through many-body interactions*
17:15	25+5	17:45	Group H.-C.Nägerl	M.J.Mark	*Multi-body interactions in a Mott-insulator state*
17:45	45	18:30	Discussions and labtours		
18:45			Bus departure to Social Event		
19:00			Dinner		

Friday, 14.10.2011

08:00	60	09:00	SFB-Business Meeting		
09:00	25+5	09:30	Group R.Blatt	B.Lanyon	*Universal digital quantum simulations*
09:30	25+5	10:00	Group G.Weihs	A.Predojevic	*Pulsed Source of Entangled Photon Pairs embedded in a Sagnac Interferometer*
10:00	35	10:35	Coffee Break		
10:35	45+10	11:30	Invited talk	M.Rudner	*Topological Transitions in Driven and Open Quantum Systems*
11:30	25+5	12:00	Group C.Bruckner	M.Zych	*Quantum interferometric visibility as a witness of general relativistic proper time*
12:00	25+5	12:30	Group H.-C.Nägerl	E.Haller	*Strong three-body correlations in 1D*

Lunch Mensa
Depature to Vienna
Train leaves Innsbruck main train station at 14:09 or 15:06

Abstracts of invited talks

A condensed matter physicist's journey into ultracold atomic physics: from ion trap quantum computation to mixtures of ultracold atomic gases in optical lattices

I will describe two main topics of work taking place at Georgetown. The first is theoretical work on using ion traps to simulate the transverse field Ising model. I will discuss results from the Monroe group in a linear Paul trap and results from the Bollinger group in a Penning trap. The second is on mixtures of ultracold atoms in optical lattices. Here I will focus on preforming molecules for creating dense cold dipolar matter, using phase separation as an entropy reservoir for cooling, and some novel nonequilibrium experiments that can be examined with mixtures.

Topological Transitions in Driven and Open Quantum Systems

The discovery of the quantized Hall effects opened a new chapter in our understanding of quantum mechanics. The theoretical explanation of these effects, which is based on the mathematical framework of topology, revealed new mechanisms through which extremely robust quantization phenomena could arise in large, and rather messy systems. Building on these ideas, whole new classes of materials with startling properties have recently been predicted and identified experimentally. Now, as we progress into the 21st century, a variety of new experimental tools offer unprecendented levels of control over a range of systems. In this talk, I will discuss new types of topologically-protected robust quantum behavior which arise in periodically-driven and open quantum systems. I will begin by reviewing various types quantization phenomena, and will provide an introduction to the connection between topology and quantum states. Then I will show how these concepts can be extended and applied in new ways to open and driven systems. Implications for experiments in solid-state, quantum optical, and cold atomic systems will be discussed.