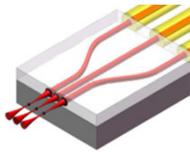


## SAP

Quantum (neutral and charged particles) and light transport  
Robust quantum and optical devices  
*Quantum (photonic) gates, algorithms?*  
*Quantum (photonic) simulation of solid-state systems?*

*Composite pulses*  
*OCT (focus on keeping the resonance condition)*  
*STA (trade-off between fast and robust)*  
*SUSY hamiltonians*

*Geometric phases*  
*Artificial magnetic fields*  
*Aharonov-Bohm phases*  
*AC/DC Josephson effect*  
*Spin-orbit coupling*  
*Dipole-dipole interactions (Rydberg atoms)*  
*Dark state adiabatic passage (spin interactions)*  
*Coulomb blockade*  
*Zeno effect*



## LIGHT AND SOUND

### Optical waveguides:

Simulation of single-particle quantum mechanics  
New devices: couplers, wavelength filters, interferometers  
*Geometric gates*  
*Bent optical waveguides (SUSY hamiltonians)?*

### Single photons in waveguides:

Quantum bomb detection (interaction free measurements)

### Photonic crystals:

*Nothing has been done so far*

### Sonic crystals:

Two coupled waveguides: RAP analogy  
*Three (or more) coupled waveguides*

## ULTRACOLD ATOMS

### Single atoms:

Filtering: vibrational states, wavepacket velocities  
2D SAP: interferometers and OAM states  
*Complex tunneling with OAM states*  
*Geometric phases. artificial magnetism?*

### Two-interacting particles:

Co-tunneling  
Quantum dispenser (single-particle subtraction)  
*Formation of molecules (dimers, trimers, Efimov states)?*  
*Extension to N interacting particles?*

### BEC:

AC/DC Josephson effect  
*Single-shot interferometry (sensitivity to g?)*  
*Unconventional geometric phase?*

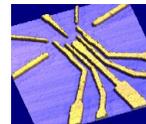
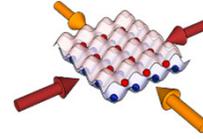
### Optical lattices:

SAP in momentum space through the flat band of a Lieb lattice  
SAP except at the edges of the Brillouin zone  
*SAP except at the Dirac cone?*  
*Studies on ferromagnetism and supersolid phases*  
*Any other optical lattice configuration?*

## ELECTRONS

### Quantum dots:

Protocols for SAP in straddling configurations  
Multiple recipient adiabatic passage  
Shot noise suppression (small Fano factor) is the signature of SAP (no backaction)  
Landau-Zener interference



## Mini Symposium: Spatial Adiabatic Passage



Spatial Adiabatic Passage

空間的断熱通過

25-27 May 2016, Okinawa Japan

## FUTURE?

### Chemistry:

*Bonding (formation of molecules),...*

### Biology:

*Photosynthesis,...*

### Nuclear dynamics:

*Tunneling (alpha-decay),...*