



Condensed Matter Theory Center Seminar

Ian Spielman
(JQI)

Tuesday, November 9
11:00am-12:30pm
2205 Physics Building

“A Bose-Einstein condensate
subject to synthetic gauge fields”

Here will first present our experimental work creating a synthetic magnetic field in a Bose-Einstein condensate (BEC) generated by an abelian vector potential and then discuss how we extend this technique to create spin-orbit coupling (and equal sum of Rashba and Dresselhaus with a controllable bias term).

We couple the internal states of rubidium 87 via a momentum-selective Raman transition and load our BEC into the resulting adiabatic eigenstates. In agreement with theory, we observe that above a critical coupling strength our BEC acts as a charged Bose gas in the presence of a conventional vector potential. Below this critical Raman coupling, the system has well defined spin degrees of freedom and acts like a spin-1/2 Bose gas with spin-orbit coupling.