

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Mott Insulators of Ultracold Alkaline Earth Fermions MICHAEL HERMELE, VICTOR GURARIE, University of Colorado at Boulder, ANA MARIA REY, JILA and University of Colorado at Boulder — A crucial basic property of antiferromagnetic insulators with $SU(2)$ spins is that adjacent spins can (and tend to) combine to form singlets, or valence bonds. The classical analog of this fact is that adjacent spins prefer to be antiparallel. These two facts underly much of our thinking about ground states of quantum antiferromagnets. Ultracold alkaline earth atoms can be used to realize magnetic insulators where a minimum of N spins is required to form a singlet, where N can be as large as 10. These systems belong to a virtually unexplored class of quantum magnets. I will show that even the simplest such models on the square lattice hold remarkable surprises.

Michael Hermele
University of Colorado at Boulder

Date submitted: 18 Nov 2009

Electronic form version 1.4