Abstract Submitted
for the TSF14 Meeting of
The American Physical Society

**Collective Bases for Spin 1/2 Systems** PHILIP VETTER, None — Robert H. Dicke studied collective spontaneous emission from a small cloud of atoms, and in 1954 predicted that collective states would have qualitatively different decay rates vs. individual atomic states.[1] Recent experiments have reportedly harnessed this phenomenon, for example, to produce "superradiant lasers" of high spectral purity.[2] Central to superradiance is the notion of the symmetric Dicke state, a collective quantum state created by the superposition of manyindividual atomic spin states. This symmetric Dicke state is the maximally symmetric state with a total of one excitation. It can be asked whether there are pseudo-symmetric states that can complete the state space, and if so, what can we say about them? This problem becomes combinatorially complex as the number of excitations increases. Mathematically, this problem involves the tensor product of spin representations. There is a beautiful expression for the decomposition of this tensor product into irreducible representations. In one particular geometry, a surprising connection with coding theory has physical significance.

[1]R.H. Dicke, Physical Review. 93, 99 (1954).
[2]J.G. Bohnet, Nature 484, 78?81 (05 April 2012)

Philip Vetter
None

Date submitted: 29 Sep 2014 Electronic form version 1.4