Quantum compass Heisenberg model on the square lattice[1] AN-
TONIO PIRES, UFMG — The quantum compass model is important for the field of
strongly correlated systems with orbital degeneracy and of solid state based devices
proposed for quantum computing. I study the compass model with the addition of
Heisenberg interactions. I consider a model on the square lattice, with x and z axis.
The nearest neighbor interactions are of two types: (a) frustrated interaction Jx and
Jz, and (b) Heisenberg interaction along both axis with exchange J.The compass in-
teractions depend on the bond direction. The model is characterized by a high level
of frustration. I use a non-linear spin wave theory where four term operators are
treated in a self consistent mean field approximation. I calculate all the possible
ordered phases at zero temperature, either with ferromagnetic or antiferromagnetic
order. I also calculate the spin structure factors and obtain the magnetization as a
function of temperature for the Ising-like phases.

Antonio Pires
UFMG

Date submitted: 13 Sep 2016