

# **THE STRUCTURE OF THE PHASE DIAGRAM FOR THE MEAN FIELD TRANSVERSE ISING MODEL**

NICHOLAS CRAWFORD

*Department of Mathematics, University of California at Los Angeles*

ABSTRACT. In this talk we will introduce a simple mean field quantum spin system (the Transverse Ising model from the title) and explain how one may solve this model with probabilistic tools. Using a certain path integral representation due to M. Aizenman and B. Nachtergaele, we represent the quantum system in terms of an interacting system of  $N$  single site processes of ‘spin paths’. Using the theory of large deviations to reduce the study of asymptotics of the system to a variational problem, we apply various correlation inequalities to obtain a precise picture of the phase diagram for this model. Of course we will try to keep the talk as self contained as possible. As time permits we hope to indicate how this picture may be applied to lattice systems.