1067-82-44 **Zhongyang Li*** (zli@math.brown.edu), 151 Thayer Street, Providence, RI 02912. *Critical Temperature of Ising Ferromagnets and Spectral Curve of Dimers.*

We prove the uniqueness of the translation invariant Gibbs measure for dimer models on a large class of periodic Fisher graphs, with arbitrary but finite period. As a result, we identify the critical temperature, defined by the supreme of the temperatures at which the spontaneous magnetization of a periodic, ferromagnetic Ising model is nonzero, and the condition that the spectral curve of the corresponding dimer model on the Fisher graph has a real node on the unit torus. A simple proof for the exponential decay of spin-spin correlations above the critical temperature for the symmetric, periodic Ising ferromagnet, as well as the exponential decay of the edge-edge correlations for all non-critical edge weights of the dimer model on periodic Fisher graphs, is obtained by our technique. (Received June 16, 2010)