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Cédric Boutillier, David Cimasoni and Béatrice de Tilière*

(detiliere@ceremade.dauphine.fr). *Dimers in statistical mechanics and genus 1 Harnack curves in algebraic geometry.*

The dimer model represents the adsorption of diatomic molecules on the surface of a crystal. It is modeled as random perfect matchings of a fixed planar graph. When the underlying graph is bipartite and periodic, one can naturally assign to such a model a curve, known as the spectral curve. By results of Kenyon, Okounkov and Sheffield, this curve is Harnack and there is a correspondence between Harnack curves and such dimer models.

We consider the dimer model in the above context assuming moreover that edges are assigned Fock's elliptic weights. We prove that spectral curves of these dimer models are in correspondence with genus 1 Harnack curves. We also prove an explicit local expression for the two-parameter family of ergodic Gibbs measures and for the slope of the measures. This is joint work with Cédric Boutillier and David Cimasoni. Note that in the course of the talk, we will be defining the dimer model, Harnack curves and Fock's elliptic weights, i.e., this is not assumed to be known. (Received January 15, 2021)