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Effective string theory on a torus: the 3d Ising interface

We use effective string theory (EST) to describe a toroidal 2d interface embedded in a 3d torus.

In particular, we compute the free energy of the interface in an expansion in inverse powers of the area, up to the first non-universal order that involves the Wilson coefficient γ_3 .

In order to test our predictions, we simulate the 3d Ising model with an anti-periodic boundary condition with a two-step multicanonical algorithm that delivers high-precision free-energy data.

Authors: MATOS, José (EPFL); Prof. PENEDONES, João (EPFL); Prof. VIANA, João (Universidade do Porto); Mr LIMA, David

Presenter: MATOS, José (EPFL)