The dynamics of the 2D SOS model

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We present new results on the (2+1)-dimensional Solid-On-Solid model at low temperatures. Bricmont, El-Mellouki and Froelich (1986) showed that in the presence of a floor there is an entropic repulsion phenomenon, lifting the surface to a height which is logarithmic in the side of the box. We refine this and establish the typical height of the SOS surface is precisely the floor of [1/(4\beta)\log n], where n is the side-length of the box and \beta is the inverse-temperature. In contrast to the 1D behavior, the Glauber dynamics for SOS is exponentially slow, as it must pass through a series of meta-stable states in order to rise from an initially flat configuration to its final height.

Based on joint works with Pietro Caputo, Eyal Lubetzky, Fabio Martinelli and Fabio Toninelli.