Phase transitions on fractals: II. Sierpinski gaskets

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Abstract. This is the second in a three paper series on phase transitions on fractals. Here we construct and investigate a family of fractals which are generalisations of the Sierpinski gaskets (SGs) to all Euclidean dimensionalities. These fractal lattices have a finite order of ramification, and can be considered 'marginal' between one-dimensional and higher-dimensional geometries. Physical models defined on them are exactly solvable. We argue that short-range spin models on the SG show no finite-temperature phase transitions. As examples, we solve a few spin models and study the resistor network and percolation problems on these lattices.