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Matthias Beck* (beck@math.sfsu.edu), Department of Mathematics, SFSU, San Francisco, CA 94132, and **Christian Haase** and **Steven Sam**. *Grid graphs, Gorenstein polytopes, and domino stackings.*

We examine domino tilings of rectangular boards, which are in natural bijection with perfect matchings of grid graphs. This leads to the study of their associated perfect matching polytopes, and we present some of their properties, in particular, when these polytopes are Gorenstein. We also introduce the notion of domino stackings and present some results and several open questions. Our techniques use results from graph theory, polyhedral geometry, and enumerative combinatorics. (Received September 12, 2008)