1018-60-259 **Gábor Pete*** (gabor@stat.berkeley.edu). *Corner percolation and related models on planar lattices.*

Corner percolation is a dependent bond percolation model on $\mathbb{Z}^2$, in which every edge is present with probability 1/2, and each vertex has exactly two incident edges, perpendicular to each other. It turns out that the connected components of this random graph can be described as the level contours of a height function given by the sum of two independent simple random walks. This connection makes it possible to understand the model thoroughly: there are only finite cycles a.s., with critical exponents $\mathbb{P}(\text{diameter of the cycle of the origin} > n) \approx n^{-\gamma}$ and $\mathbb{E}(\text{length of a cycle conditioned on having diameter } n) \approx n^{\delta}$, where $\gamma = (5-\sqrt{17})/4 = 0.219...$ and $\delta = (\sqrt{17}+1)/4 = 1.28....$ The value of the "dimension" δ comes from the solution of a singular sixth order ODE, while the relation $\gamma + \delta = 3/2$ corresponds to the level sets of Additive Brownian Motion having Hausdorff dimension 3/2.

Corner percolation has inspired the definition of several natural dependent percolation models on $\mathbb{Z}^2$ and other lattices. I will present some preliminary results and intriguing open problems about these models. (Received March 07, 2006)