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Jian Ding, Eyal Lubetzky and Yuval Peres* (peres@microsoft.com), Microsoft Research, 1 Microsoft way, Redmond, WA 98052. *1. The Cutoff Phenomenon for Markov chains, and the Ising model.*

More than twenty years ago, Diaconis and Shashahani proved a "cutoff" (concentration of the mixing time) for random transpositions, and Aldous showed it for random walk on a hypercube. The cutoff phenomenon is believed to be widespread, but still known in relatively few cases. The case of random walk on transitive expanders is intriguing. I will discuss several conjectures and examples pertinent to understanding this phenomenon. Levin, Luczak and Peres considered the Ising model on the complete graph, and established the cutoff phenomenon for Glauber dynamics above the critical temperature, and mixing time $n^{3/2}$ at criticality. We obtain a complete picture interpolating between the critical and high temperature behavior, as well as proving cutoff for the dynamics restricted to positive magnetization at low temperature. The proof is based on a sharp criterion for cutoff in birth-and death chains. The results, but not the method, should generalize to many other base graphs. (Received August 12, 2008)