Dirac's theorem for random regular graphs.

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Abstract

We prove a 'resilience' version of Dirac's theorem in the setting of random regular graphs. More precisely, we show that, whenever d is sufficiently large compared to $\varepsilon > 0$, a.a.s. the following holds: let G' be any subgraph of the random n-vertex d-regular graph $G_{n,d}$ with minimum degree at least $(1/2 + \varepsilon)d$. Then G' is Hamiltonian.

This proves a conjecture of Ben-Shimon, Krivelevich and Sudakov. Our result is best possible: firstly, the condition that d is large cannot be omitted, and secondly, the minimum degree bound cannot be improved. This is joint work with Alberto Espuny Díaz, António Girão, Daniela Kühn and Deryk Osthus.