Optimal covers with Hamilton cycles in random graphs

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A packing of a graph G with Hamilton cycles is a set of edge-disjoint Hamilton cycles in G. Such packings have been studied intensively and recent results imply that a largest packing of Hamilton cycles in $G_{n,p}$ a.a.s. has size $\lfloor \delta(G_{n,p})/2 \rfloor$. Glebov, Krivelevich and Szabó recently initiated research on the 'dual' problem, where one asks for a set of Hamilton cycles covering all edges of G. In [2], we prove that for $\frac{\log^{117} n}{n} \leq p \leq 1 - n^{-1/8}$, a.a.s. the edges of $G_{n,p}$ can be covered by $\lceil \Delta(G_{n,p})/2 \rceil$ Hamilton cycles. This is clearly optimal and improves an approximate result of Glebov, Krivelevich and Szabó [1], which holds for $p \geq n^{-1+\varepsilon}$. Our proof is based on a result of Knox, Kühn and Osthus [3] on packing Hamilton cycles in pseudorandom graphs.

References

[1] R. Glebov, M. Krivelevich and T. Szabó, On covering expander graphs by Hamilton cycles, *Random Structures & Algorithms* (to appear).
[2] D. Hefetz, D. Kühn, J. Lapinskas and D. Osthus, Optimal covers with Hamilton cycles in random graphs, *Combinatorica* (to appear).
[3] F. Knox, D. Kühn and D. Osthus, Edge-disjoint Hamilton cycles in random graphs, *Random Structures & Algorithms* (to appear).