Title: When Hamilton circuits generate the cycle space of a random graph

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Abstract: In the face of the difficulty of characterizing hamiltonicity of a graph, the last two decades have seen the emergence of another perspective to study hamiltonicity: investigate the set of all Hamilton circuits of a hamiltonian graph. Typical questions are total number and relative position of the Hamilton circuits. A variation on that theme is the 'richness property' of the set of all Hamilton circuits being a mod 2 generating system of the cycle space of the graph: in this talk I will present a proof that for every $\varepsilon > 0$ and $p > n^{-1/2+\varepsilon}$, in an Erdős–Rényi random graph $G_{n,p}$ asymptotically almost surely its Hamilton circuits generate its cycle space, and moreover describe ongoing work to improve $-1/2$ to $-2/3$. As it is known from work of Glebov, Knox, Krivelevich, Kühn, Osthus, Samotij and others that already for $p \gg (\log n + \log\log n)/n$ a.a.s. $G_{n,p}$ contains many well spread out Hamilton circuits, it seems plausible that the above statement remains true even for p that small, but a proof of this still seems out of reach.