Disjoint cycles in graphs with restricted independence number

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In 1963, K. Corrádi and A. Hajnal verified a conjecture of Erdős by showing that every n-vertex graph where $n \geq 3k$ and $\delta(G) \geq 2k$ contains k vertex-disjoint cycles. The conditions in this statement are known to be best possible, and in 2017, Kierstead, Kostochka, and Yeager provided a complete characterization of all the sharpness examples. When examining this characterization more closely, one sees that when $k > 2$ and $n > 3k$, each sharpness example contains a large independent set of size $n - 2k + 1$. This hints that it may be possible to generalize the result of Corrádi and Hajnal by weakening the minimum degree condition in graphs whose independence number is not too big. This indeed is the case, and in this talk we will discuss how for t sufficiently large, $k \geq 25t$ and $n \geq 4k + t$, if G is an n-vertex graph with $\delta(G) \geq 2k - t$ and $\alpha(G) \leq n - 2k - t + o(t)$, then G contains k vertex-disjoint cycles, and furthermore, this is asymptotically sharp.

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