Graphs with girth 2ℓ and without longer even holes are 3-colorable

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For a number $\ell > 1$, let $\mathcal{H}_\ell$ denote the family of graphs which have girth 2ℓ and have no even hole with length greater than $2\ell + 2$. Wu, Xu, and Xu conjectured that every graph in $\bigcup_{\ell>1} \mathcal{H}_\ell$ is 3-colorable. Recently, we prove that every graph in $\bigcup_{\ell\geq 5} \mathcal{H}_\ell$ is 3-colorable. In this talk, I will introduce some key ideas used to prove our result.