On the $\frac{3}{8}$-conjecture for independent domination in cubic graphs

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A set S of vertices in a graph G is a dominating set of G if every vertex not in S is adjacent to a vertex in S. An independent dominating set in G is a dominating set of G with the additional property that it is an independent set. The domination number, $\gamma(G)$, and the independent domination number, $i(G)$, are the minimum cardinalities among all dominating sets and independent dominating sets in G, respectively. By definition, $\gamma(G) \leq i(G)$ for all graphs G. In 1996 Reed [Combin. Probab. Comput. 5 (1996), 277–295] proved a breakthrough result that $\gamma(G) \leq \frac{3}{8}n$ holds for all connected cubic graphs of order n. In 2013 the following stronger statement was conjectured: if G is different from $K_{3,3}$ and the 5-prism $C_5 \,\square\, K_2$, then $i(G) \leq \frac{3}{8}n$.

In this talk, I intend to present main steps and ideas of a proof of the $\frac{3}{8}$-conjecture. It is based on the joint work with Tanja Dravec and Michael A. Henning.