New Families of 3-Existentially Closed Graphs

A graph is n-existentially closed (n-e.c.) if for any two sets of vertices A and B with $|A|+|B| = n$ there exists a vertex $x \in V \setminus (A \cup B)$ that is adjacent to every vertex in A and to none in B. An operation is said to preserve the n-e.c. property if the result is an n-e.c. graph if applied on some n-e.c. graphs. Beside symmetric difference of two graphs that is shown to preserve the 3-e.c. property, in 2003 another 3-e.c. preserving graph operation was introduced. We have taken a different approach to the operation (denoted by $\bowtie$) that enables us to relax the requirement that both graphs considered be 3-e.c. We determine necessary and sufficient conditions that $G \bowtie H$ is 3-e.c. given that H is 3-e.c. The graph G can have as few as four vertices, which represents an improvement in comparison to when G is required to be 3-e.c.

This is a joint work with David A. Pike.