The algorithm referred to in the title builds on Luks's powerful group-theoretic divide-and-conquer method (1980) and addresses the bottleneck situation where Luks's method fails to "divide". Luks will continue to "conquer" if an alternative method "divides"; we develop such a partitioning technique.

In the talk we shall outline the algorithm and explain in some detail its group theoretic core, the "Unaffected Stabilizers Lemma" and the "Local Certificates" routine. The Lemma is used to construct, somewhat implausibly, global automorphisms out of local information -- a key step toward the construction of combinatorial structures to which the partitioning method from the previous day's lecture will be applied, providing the required "divide" step.