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**Robert H. Gilman\*** ([rgilman@stevens.edu](mailto:rgilman@stevens.edu)), Department of Mathematical Sciences, Stevens Institute of Technology, Hoboken, NJ 07030. *Complexity of computations on compressed words*. Preliminary report.

Computations with compressed words have recently become more common in group theory. For example Saul Schleimer has used this technique to show that the word problem for the automorphism group of a free group is decidable in polynomial time. Usually one is interested in showing that a computation with compressed words is feasible. We will consider instead how to use compression to make solvable problems more difficult. We are motivated by cryptological concerns. (Received March 29, 2010)