1086-20-429 **Markus Lohrey*** (lohrey@informatik.uni-leipzig.de), University of Leipzig, Institut fuer Informatik, PF 100920, 04009 Leipzig, Germany. *Relating the compressed word problem and the word search problem.* Preliminary report.

Algorithms for compressed words have recently found applications in combinatorial group theory. For the compressed representation of words we use straight-line programs (SLPs). An SLP is a context-free grammar C that generates a unique string $\mathrm{val}(C)$. This allows for exponential compression. Fix a finitely generated (f.g.) group G with symmetric generating set A. The compressed word problem (CWP) for G asks, whether for a given SLP C with terminal alphabet A one has $\mathrm{val}(C) = 1$ in G. It is known that if G has a polynomial time CWP, then every f.g. subgroup of $\mathrm{Aut}(G)$ has a polynomial time (ordinary) word problem. For example, right-angled Artin groups, f.g. nilpotent groups, Coxeter groups, and fully residually free groups have polynomial time CWPs. Another computational problem that is important in our context is the word search problem (WSP). For a given word $w \in A^*$, the goal is to compute a Van Kampen diagram for w in case $w = 1$ in G. Automatic groups and f.g. nilpotent groups have polynomial time WSPs. Our main result states the following: Let $1 \to K \to G \to Q \to 1$ be a short exact sequence of f.g. groups such that K has a polynomial time CWP and Q has a polynomial time WSP. Then G has a polynomial time (ordinary) word problem. (Received September 01, 2012)