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**Jeffrey A Mermin\*** ([mermin@math.cornell.edu](mailto:mermin@math.cornell.edu)), Department of Mathematics, 310 Malott Hall, Cornell University, Ithaca, NY 14853. *Compression*.

Compression is a technique introduced by Macaulay to study Hilbert functions. Using it, we obtain the following results:

- (1) We prove that the Eisenbud-Green-Harris Conjecture holds for ideals containing a monomial regular sequence.
- (2) We show that Evans' Lex-plus-powers Conjecture holds for ideals containing the squares of the variables.
- (3) We find new classes of quotient rings over which lex ideals attain all Hilbert functions.
- (4) We prove a generalized Green's Theorem over a polynomial ring modulo powers of the variable. (The original Green's Theorem holds over polynomial rings).
- (5) We provide new proofs of Macaulay's and Clements-Lindstrom's Theorems.
- (6) We obtain a structure theorem for compressed ideals.

Some of the results are joint with I. Peeva and M. Stillman. (Received September 28, 2005)