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**Mark Haiman\***, Department of Mathematics, 970 Evans Hall, University of California, Berkeley, CA 94720-3840, and **Li-Chung Chen**. *A Representation-Theoretic Model for  $k$ -Atoms*. Preliminary report.

I'll describe the construction of certain graded  $S_n$  modules whose characters we conjecture to be the  $k$ -atoms of Lascoux, Lapointe and Morse. Additional conjectured properties of the modules would imply in a natural way some of the latter authors' conjectures about  $k$ -atoms, including the positivity of Macdonald polynomials with respect to  $k$ -atoms.

Initially, the construction of the modules was itself also a conjecture, but this part is now a theorem, thanks to work of my student Li-Chung Chen. His work also brings to light some beautiful new combinatorics, which I will explain. (Received March 11, 2008)