1092-05-142 **Lucas Kramer** and **Ryan R. Martin*** (rymartin@iastate.edu), Department of Mathematics, 396 Carver Hall, Iowa State University, Ames, IA 50010, and **Michael Young**. *Diamond-free families in the Boolean lattice.*

For a family of subsets of $\{1, \ldots, n\}$, ordered by inclusion, and a partially-ordered set P, we say that the family is P-free if it does not contain a subposet isomorphic to P. We want to compute $\mathrm{La}(n, P)$, the largest size of a P-free family of subsets of $\{1, \ldots, n\}$. It is conjectured that, for any fixed P, this quantity is $(k + o(1))\binom{n}{\lfloor n/2 \rfloor}$ for some fixed integer k, depending only on P. The conjecture has been verified for a number of small posets P as well as posets of a "tree shape." The smallest poset for which this conjecture is open is Q_2, the Boolean lattice on two elements, also called a "diamond." We will discuss improved bounds on the size of a Q_2-free family, utilizing Razborov's flag algebra method. (Received August 06, 2013)