1011-47-271 **Gary Weiss** (`weiss@math.uc.edu`), Department of Mathematics, University of Cincinnati, Old Chem. 839, ML 0025, Cincinnati, OH 45221, and **Vrej Zarikian*** (`zarikian@usna.edu`), Department of Mathematics, United States Naval Academy, 572C Holloway Road, Annapolis, MD 21402. *Paving Small Matrices.* Preliminary report.

The Kadison-Singer Problem, posed in 1959, asks whether every pure state on the diagonal of $B(\ell^2)$ extends uniquely to a pure state on all of $B(\ell^2)$. It is equivalent to a variety of important problems in mathematics and engineering (cf. Casazza's invited address at GPOTS 2005). Among these reformulations is the Paving Conjecture of Anderson:

> *Given $\varepsilon > 0$, there exists a $k \in \mathbb{N}$ such that for any $n \in \mathbb{N}$ and any $A \in M_n(\mathbb{C})$ with zero diagonal, there exist diagonal projections $P_1, P_2, ..., P_k \in M_n(\mathbb{C})$ such that $P_1 + P_2 + ... + P_k = I$ and*
>
> $$\|P_j A P_j\| \leq \varepsilon \|A\|, \ 1 \leq j \leq k.$$

In spite of significant progress by Berman-Halpern-Kaftal-Weiss and Bourgain-Tzafriri, the Paving Conjecture (and therefore the Kadison-Singer Problem) remain open. In this talk, we examine the Paving Conjecture for "small" parameter values: $k = 3$ and $n \leq 10$. Using a combination of graph theory and operator theory, we determine the sharp ε for $n = 4, 5, 6$. By altogether different considerations, we produce examples of "bad pavers" of size $n = 7, 10$. (Received August 29, 2005)