New projections and duality in Bergman spaces

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Given a domain $\Omega \subset \mathbb{C}^n$ and $p > 1$, let $A^p(\Omega)$ denote the L^p-Bergman space, the holomorphic subspace of $L^p(\Omega)$. When Ω is smoothly bounded and strongly pseudoconvex, it is well known that the dual of $A^p(\Omega)$ can be naturally identified with $A^q(\Omega)$, where $p^{-1} + q^{-1} = 1$. This follows the established paradigm seen in ordinary L^p-spaces, and is closely linked to the L^p-mapping regularity of the Bergman projection.

The presence of boundary singularities can cause the above dual space characterization to fail. In this talk, we look at this question on monomial polyhedra, a class of non-smooth and weakly pseudoconvex domains in $\mathbb{C}^n$, where the L^p-regularity of the Bergman projection and the A^p-A^q duality paradigm both break down. We will construct a family of new projection operators with better L^p-mapping behavior than the Bergman projection, then use them to concretely characterize the duals of A^p-spaces on these domains.