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*Binomial ideals associated to polycubes.*

A unit cube in $\mathbb{R}^3$ is a set of the form $\{(x,y,z) \in \mathbb{R}^3 : a \leq x \leq a+1,\ b \leq y \leq b+1,\ c \leq z \leq c+1\}$, where $(a,b,c) \in \mathbb{N}^3$. In this talk, we associate a binomial ideal to a collection of unit cubes. We discuss the algebraic invariants of this ideal when the collection of cells forms a polycube. For a certain class of polycubes, we prove that the associated quotient ring is Koszul, and we characterize when this quotient ring is Cohen–Macaulay by studying its initial ideal.