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Koszul property of projections of the Veronese cubic surface.

Let $V \subset \mathbf{P}^9$ be the Veronese cubic surface. We classify the projections of V to \mathbf{P}^8 whose coordinate rings are Koszul. In particular we obtain a purely theoretical proof of the Koszulness of the pinched Veronese, a result obtained originally by Caviglia using filtrations, deformations and computer assisted computations. To this purpose we extend, to certain complete intersections, results of Conca, Herzog, Trung and Valla concerning homological properties of diagonal algebras. (Received February 13, 2012)