Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)
Vol. XXVI (2025), 1665-1676

On the parity conjecture for Hilbert schemes of points on threefolds

RITVIK RAMKUMAR AND ALESSIO SAMMARTANO

Abstract. Let $\mathrm{Hilb}^d(\mathbb{A}^3)$ be the Hilbert scheme of d points in $\mathbb{A}^3$, and let T_z denote the tangent space to a point $z \in \mathrm{Hilb}^d(\mathbb{A}^3)$. Okounkov and Pandharipande have conjectured that $\dim T_z$ and d have the same parity for every z. For points z parametrizing monomial ideals, the conjecture was proved by Maulik, Nekrasov, Okounkov, and Pandharipande. In this paper, we settle the conjecture for points z parametrizing homogeneous ideals. In fact, we state a generalization of the problem to Quot schemes of $\mathbb{A}^3$, and we settle it for points parametrizing graded modules.

Mathematics Subject Classification (2020): 14C05 (primary); 13D07, 13P10 (secondary).