The smallest minimal blocking sets of $Q(6, q)$, q even

Jan De Beule

Ghent University, Department of Pure Mathematics and Computer Algebra,
Krijgslaan 281, 9000 Gent, Belgium.
Joint work with: Leo Storme

Using results on the size of the smallest minimal blocking sets of $Q(4, q)$, q even, of Eisfeld, Storme, Szőnyi and Sziklai [2], and results concerning the number of internal nuclei of $(q+2)$-sets in $PG(2, q)$, q even, of Bichara and Korchmáros [1], together with projection arguments, we obtain the following characterization of the smallest minimal blocking sets of $Q(6, q)$, q even and $q \geqslant 32$:

Theorem 1 *Let $\mathcal{K}$ be a minimal blocking set of $Q(6, q)$, q even, $|\mathcal{K}| \leqslant q^3 + q$, $q \geqslant 32$. Then there is a point $p \in Q(6, q) \setminus \mathcal{K}$ with the following property: $T_p(Q(6, q)) \cap Q(6, q) = pQ(4, q)$ and $\mathcal{K}$ consists of all the points of the lines L on p meeting $Q(4, q)$ in an ovoid $\mathcal{O}$, minus the point p itself, and $|\mathcal{K}| = q^3 + q$.*

1. A. Bichara and G. Korchmáros, *Note on $(q + 2)$-sets in a Galois plane of order q*, Combinatorial and geometric structures and their applications (Trento, 1980), pages 117–121. North-Holland, Amsterdam, 1982.

2. J. Eisfeld, L. Storme, T. Szőnyi, and P. Sziklai, *Covers and blocking sets of classical generalized quadrangles*, Discrete Math., 238(1-3):35–51, 2001.