AUTOMORPHISMS OF THE MCKAY-MILLER-ŠIRÁŇ GRAPHS

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McKay, Miller, Širáň (J. Combinat. Theory Ser. B **74** (1998) No. 1, 110-118.) discovered a family of vertex-transitive graphs H_q (indexed by prime powers $q \equiv 1 \pmod 4$) of degree $d = (3q-1)/2$, diameter 2, and order $\frac{8}{9}(d+\frac{1}{2})^2$. The graphs H_q are the currently largest known vertex-transitive graphs of diameter 2 and given degree d. These graphs were originally constructed as lifts of the graphs $K^*_{q,q}$ obtained from the complete bipartite graphs $K_{q,q}$ by attaching $\frac{q-1}{4}$ loops to each vertex. Recently, the author simplified the construction of the graphs H_q by showing that they can be obtained as regular covers of the graphs D^*_q, the q-dipoles with $\frac{q-1}{4}$ loops at each of the two vertices.

In this contribution we will study the automorphisms of the graphs H_q which are lifts of the automorphisms of the graphs $K^*_{q,q}$ and D^*_q.