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Jin-Hong Kim* (jinkim@math.okstate.edu), Department of Mathematics, Oklahoma State University, Stillwater, OK 74078. *On 4-manifolds with even intersection forms.*

We investigate the fundamental question of which even quadratic forms can be realized as intersection forms of smooth 4-manifolds. More specifically, let X be a closed, smooth spin 4-manifold with $b_1(X) = 0$ which admits a smooth even spin $\mathbb{Z}/2^p$ action. We show that under some non-degeneracy conditions the following inequality between the positive part $b_2^+(X)$ of the second Betti number and the signature $\sigma(X)$ holds: $b_2^+(X) \geq \frac{|\sigma(X)|}{8} + p + 1$. This is an improvement of the Furuta's $\frac{10}{8}$ -theorem and J. Bryan's results on odd case in the presence of the even spin $\mathbb{Z}/2^p$ -symmetry on X . As an application, we also give a classification of even spin $\mathbb{Z}/4$ actions on homotopy $K3$ surfaces. Moreover, in case X is a closed smooth non-spin 4-manifold with even intersection form, we describe an approach to the $\frac{10}{8}$ -conjecture answering the above fundamental question. (Received September 26, 2000)