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Lenny Fukshansky* (lenny@math.tamu.edu), Department of Mathematics, Mailstop 3368, Texas A&M University, College Station, TX 77843-3368. *Effective theorems for quadratic spaces over $\overline{\mathbb{Q}}$.*

Let $N \geq 2$ be an integer, F a quadratic form in N variables over $\overline{\mathbb{Q}}$, and $Z \subseteq \overline{\mathbb{Q}}^N$ an L -dimensional subspace, $1 \leq L \leq N$. We prove the existence of a small-height maximal totally isotropic subspace of the bilinear space (Z, F) . This provides an analogue over $\overline{\mathbb{Q}}$ of well-known theorems of Schlickewei-Schmidt and Vaaler proved respectively over \mathbb{Q} and over a number field. We use our result to prove an effective version of Witt orthogonal decomposition for a bilinear space over $\overline{\mathbb{Q}}$. We also demonstrate an orthogonal version of Siegel's lemma for a bilinear space over $\overline{\mathbb{Q}}$. This extends previous results of the author over a number field. All bounds on height are explicit. (Received September 18, 2005)