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Low-Dimensional Algebraic Tori Split by 2-groups

Let T be an algebraic torus over a field F and let $\mathrm{CH}^2(BT)$ be the Chow group of codimension 2 cycles in its classifying space. Following work of Blinstein and Merkurjev on the structure of the torsion part of $\mathrm{CH}^2(BT)$, Scavia, in a recent preprint, found an example of an algebraic torus with non-trivial torsion in $\mathrm{CH}^2(BT)$. In recent joint work with Alexander Neshitov, we showed computationally that the group $\mathrm{CH}^2(BT)$ is torsion-free for all algebraic tori of dimension at most 5 and determine the conjugacy classes of finite subgroups of $\mathrm{GL}_6(\mathbb{Z})$ which correspond to 6-dimensional tori with nontrivial torsion in $\mathrm{CH}^2(BT)$. We explain these results using the birational structure of low-dimensional algebraic tori split by 2-groups.