Conjugacy Classes of Torsion Elements in the Crystallographic Group $B_n/[P_n, P_n]$

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Resumo

Let B_n (resp. P_n) denote the Artin braid group (resp. the Artin pure braid group) with n strings and let $n \geq 3$. We show that the quotient $\dfrac{B_n}{[P_n, P_n]}$ is a crystallographic group, where $[P_n, P_n]$ means the commutator subgroup of P_n. This quotient has torsion elements in contrast to the (pure) braid groups P_n and B_n. We classify the torsion elements and its conjugacy classes in the crystallographic group $\dfrac{B_n}{[P_n, P_n]}$. Finally, for $n \leq 7$ we show that $\dfrac{B_n}{[P_n, P_n]}$ does not have non-abelian finite subgroups. The case $n > 7$ seems to be an open question, or possibly the classification of all non-abelian subgroups of $B_n/[P_n, P_n]$ for $n > 7$ can be more general.