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Groups with Root-System of Type BC_ℓ

Let Φ be an irreducible, spherical, possibly nonreduced root system of rank $\ell \geq 2$ and G a group generated by subgroups $A_r, r \in \Phi$ satisfying:

- (i) $X_r = \langle A_r, A_{-r} \rangle$ is a rank one group (in the sense of [Ti1]) for $r \in \Phi$.
- (ii) If $r, s \in \Phi$ with $r \neq -s$ or $-2s$ (resp. $s \neq -r$ or $-2r$), then $[A_r, A_s] \leq \langle A_{\lambda r + \mu s} \mid \lambda, \mu \in \mathbb{N} \text{ with } \lambda r + \mu s \in \Phi \rangle$.

Clearly, by the Steinberg-Presentation, all Chevalley-groups satisfy these conditions. Conversely, by [M], [Ti2,3 and 4] and the above paper the structure of a group satisfying (i) and (ii) is determined, apart from the special cases when Φ is of type G_2 or 2F_4 . The above paper treats the final case, when Φ is of type $BC_\ell, \ell \geq 2$, which corresponds to unitary groups which are not of maximal Witt-index.

[Mü] Müller, C., On the Steinberg-presentation for Lie-type-groups of type C_2 , J. of Algebra, **252** (2002), 150–160

[Ti1] Timmesfeld, F. G., Abstract Root Subgroups and simple groups of Lie-type, Monographs in Mathematics 95, Birkhuser Verlag, 2001

[Ti2] Timmesfeld, F. G., On the Steinberg-Presentation of Lie-type groups, to appear in Forum Math. (2002)

[Ti3] Timmesfeld, F. G., A remark on Presentations of certain Chevalley groups, to appear in Archiv der Mathematik. (2002)

[Ti4] Timmesfeld, F. G., Groups with a central factor of Lie-type, to appear in J. of Algebra.