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It is well known that the simple Lie algebra  $L$  of type  $D_4$  is in many ways different from the other members of the  $D$  series. This exceptional behavior is due to the phenomenon of *triality*, that is, the existence of outer automorphisms of order 3 that cyclically permute the natural module and the two half-spin modules.

In this talk, we will study gradings on  $L$  by an arbitrary group  $G$ , assuming the ground field  $F$  to be algebraically closed,  $\text{char } F \neq 2$ . Gradings on matrix algebras and the corresponding classical simple Lie algebras were studied earlier by several authors. In particular,  $L$  can be realized as skew-symmetric elements in the matrix algebra  $M_8(F)$ , and some of the  $G$ -gradings on  $L$  are constructed in the same way as for other Lie algebras of skew-symmetric elements.

To obtain the remaining gradings on  $L$ , we use affine group schemes (equivalently, commutative Hopf algebras) to transfer gradings between  $L$  and the so-called trialitarian algebra  $E$ : the product of three copies of  $M_8(F)$  equipped with some additional structure. (Received August 18, 2014)