Solleveld, Maarten
Pseudo-reductive and quasi-reductive groups over non-Archimedean local fields. (English) 

Author’s abstract: Among connected linear algebraic groups, quasi-reductive groups generalize pseudo-reductive groups, which in turn form a useful relaxation of the notion of reductivity. We study quasi-reductive groups over non-archimedean local fields, focusing on aspects involving their locally compact topology. For such groups we construct valuated root data (in the sense of Bruhat-Tits) and we make them act nicely on affine buildings. We prove that they admit Iwasawa and Cartan decompositions, and we construct small compact open subgroups with an Iwahori decomposition. We also initiate the smooth representation theory of quasi-reductive groups. Among others, we show that their irreducible smooth representations are uniformly admissible, and that all these groups are of type I. Finally we discuss how much of these results remains valid if we omit the connectedness assumption on our linear algebraic groups.

From the introduction: The upshot of all the above geometric results is that quasi-reductive $F$-groups are actually not so different from reductive groups. The main difference lies in the structure of Cartan subgroups and $F$-Cartan subgroups, i.e. the centralizers of maximal $F$-split tori in $G$.

Reviewer: Wilberd van der Kallen (Utrecht)

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20G25 Linear algebraic groups over local fields and their integers
20G07 Structure theory for linear algebraic groups
22E50 Representations of Lie and linear algebraic groups over local fields

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linear algebraic groups; pseudo-reductive groups; local fields; Bruhat-Tits theory; compact open subgroups; smooth representations

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