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**David Goldberg\*** (goldberg@math.purdue.edu), Department of Mathematics, Purdue University, 150 N. University Street, W. Lafayette, IN 47907, and **Alan Roche**. *On dual  $R$ -groups for classical  $p$ -adic groups.*

We study the classical groups  $G = SO_{2n+1}(F)$ ,  $Sp_{2n}(F)$ , and  $SO_{2n}(F)$  with  $F$  a  $p$ -adic field of characteristic zero. Suppose  $M = \mathbf{M}(F)$  is a Levi subgroup, with Langlands dual group  ${}^L M$ . If  $\varphi : W'_F \rightarrow {}^L M$  is a Langlands parameter for and  $L$ -packet  $\Pi_\varphi(M)$  of  $M$ , then to each element  $\pi \in \Pi_\varphi(M)$  is associated an Arthur  $R$ -group  $R_{\varphi,\pi}$ , which is a quotient of a certain Weyl group in the  ${}^L G^\circ$ -centralizer  $S_\varphi$  of the image of  $\varphi$ . Arthur conjectures that  $R_{\varphi,\pi} \simeq R(\pi)$ , the Knapp-Stein  $R$ -group, which describes the reducibility of the parabolically induced representation  $i_{G,M}(\pi)$ . For  $SO_{2n+1}$  this is proved by D. Ban and Y. Zhang. Here we give a direct computational proof of the conjecture in many cases for all three classical groups. For this exposition we will mostly concentrate on selected examples and discuss their generalizations. (Received August 26, 2008)