1048-15-347 **Christopher Dometrius*** (chris.dometrius@lr.edu), PO Box 7216, Lenoir-Rhyne University, Hickory, NC 28603, and **Aloysius Helminck** and **Ling Wu**. *Bilinear Forms on $V = k^n$ and Involutions of SL(n,k) and SO(n,k,β).* Preliminary report.

Reductive symmetric spaces are defined as the homogeneous spaces G/H with G a reductive group and H the fixed point group of an involution. To classify these spaces one has to classify the involutions. We show first that there is a natural correspondence between outer involutions and non-degenerate symmetric or skew-symmetric bilinear forms. This enables one to classify isomorphism classes of these involutions using congruence properties of bilinear forms.

We use this to give a detailed characterization for the classes of involutions of $SL(n, k)$ and classify them for a number of fields, including algebraically closed fields, real numbers, p-adic numbers, and finite fields. Next we give a characterization for the classes of involutions of $SO(n, k, \beta)$ where β is any non-degenerate symmetric bilinear form. Finally, we classify the involutions of $SO(n, k, \beta)$ in the case of the standard bilinear form for the same fields listed above. (Received February 10, 2009)