Let $G$ be a connected reductive algebraic group defined over a field $k$ of characteristic not 2, $\sigma$ an involution of $G$ defined over $k$, $H$ a $k$-open subgroup of the fixed point group of $\sigma$ and $G_k$ (resp. $H_k$) the set of $k$-rational points of $G$ (resp. $H$).

The variety $G_k/H_k$ is a generalization of a real reductive symmetric spaces to arbitrary fields and is called a symmetric $k$-variety. For real and $p$-adic symmetric $k$-varieties the space $L^2(G_k/H_k)$ of square integrable functions decomposes into several series, one for each $H_k$-conjugacy class of Cartan subspaces of $G_k/H_k$. In this talk we will discuss some recent results about the $H_k$-conjugacy classes of Cartan subspaces. (Received September 19, 2011)