1015-35-211 **Gerardo A Mendoza*** (gmendoza@temple.edu), Department of Mathematics, Temple University, Philadelphia, PA 19122. *On eigenspaces, hypoellipticity, and positivity of* $\mathbb{R}$*-invariant differential operators.* Preliminary report.

Let M be a compact manifold, let T be a globally defined real smooth nowhere vanishing vector field on M, and let $\mathfrak{a}_t$ denote the one-parameter group of diffeomorphisms generated by T. Suppose there is a T- invariant positive density on M. Let $E \to M$ be a Hermitian vector bundle and suppose there is a one-parameter group of isometries $\mathfrak{a}_t^* : E \to E$ covering $\mathfrak{a}_{-t}$. Let $L_T \in \mathrm{Diff}^1(M, E)$ be the differential operator associated with this action. Suppose $P \in \mathrm{Diff}^m(M; E)$ commutes with L_T. We will outline proofs of the following two statements. (1) If $\sigma(P) + \sigma(-iL_T)^m - \lambda I$ is invertible for λ in a real line in $\mathbb{C}$ on $T^*M \setminus 0$ then $-iL_T : C^\infty(M; E) \cap \ker P \to C^\infty(M; E) \cap \ker P$ has a selfadjoint Fredholm extension $L_T : \mathcal{D} \subset L^2(M; E) \cap \ker P \to L^2(M; E) \cap \ker P$, so it has discrete spectrum contained in $\mathbb{R}$. (2) If in addition P is hypoelliptic on $\{\nu \in \mathrm{Char}(P) : \sigma(-iL_T)(\nu) > 0\}$, then the spectrum of $-iL_T$ has only finitely many negative elements. Time permitting, we will give applications to the analysis of the b-spectrum of an elliptic b-complex. (Received February 06, 2006)