1037-43-79 **E. Hernandez**, **H. Sikic** and **G. Weiss*** (guido@math.wustl.edu), Department of Mathematics, Box 1146, Washington University, St. Louis, MO 63130, and **E. Wilson**. *Principal Invariant Subspaces for Unitary Representations of LCA Groups.*

For $\psi \in L^2(\mathbb{R})$ let $< \psi >$ be the closure of the finite linear combinations of the integer translations $T_k\psi = \psi(\cdot - k)$. Properties of the collection $\{T_k\psi : k \in \mathbb{Z}\}$ in $< \psi >$ can be studied by using the "periodization" function $P_\psi(\xi) = \sum_{l\in\mathbb{Z}} |\widehat{\psi}(\xi + l)|^2$. The spaces $< \psi >$ are known as principal invariant subspaces and play a key role in the MRA theory of wavelets. Now consider integer translations $T_k\psi = \psi(\cdot - k)$ and integer modulations $M_l\psi = e^{2\pi k\cdot}\psi$ of a single function ψ. We obtain the Gabor system $\{T_kM_l\psi : k, l \in \mathbb{Z}\}$, that can be studied using the Zak transform $Z\psi(x, \xi) = \sum_{l\in\mathbb{Z}} \psi(x + l)e^{2\pi il\xi}$, as the analog of P_ψ. These results are particular cases of a more general theory involving unitary representations of a LCA group on a Hilbert space. We need to introduce the notion of integrable representation, that generalizes the periodization function and the Zak transform described above. In this setting we give precise characterizations for Riesz bases and frames and study biorthogonality properties. These results are also valid in any dimension and for more general systems. (Received January 23, 2008)