1079-43-105 **Chal Benson*** (bensonf@ecu.edu) and **Gail Ratcliff**. *Well-behaved multiplicity free actions.*

Let K be a compact Lie group acting unitarily on a finite dimensional hermitian vector space V and form the associated representation of K in the polynomial ring $\mathbb{C}[V]$. One calls $K : V$ a (linear) *multiplicity free action* when this associated representation is multiplicity free. We introduce a criterion for such an action to be *well-behaved*. This imposes a compatibility between the moment mapping for $K : V$ and highest weight vectors occurring in $\mathbb{C}[V]$. Our main result is that if $K : V$ is irreducible then it is well-behaved. Our proof involves case-by-case analysis working from Kac's classification of irreducible multiplicity free actions. The study of well-behaved multiplicity free actions is motivated by an application to analysis with spherical functions for Gelfand pairs associated with Heisenberg groups. (Received December 29, 2011)