Asymptotic spherical analysis on the Heisenberg group

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The group $K = U(n) \times U(p)$ acts multiplicity free on $\mathcal{P}(V)$, the space of polynomials on $V = M(n, p; \mathbb{C})$, the space of $n \times p$ complex matrices. The group K acts also on the Heisenberg group $H = V \times \mathbb{R}$. By a result of Carcano, the pair (G, K), with $G = K \ltimes H$, is a Gelfand pair. Asymptotics of the spherical functions related to the pair (G, K) for large n and p are related to spherical functions for an Olshanski spherical pair.