1125-81-798 **Ian Marquette*** (i.marquette@uq.edu.au), St Lucia, QLD 4072, Australia, and **Fazlul Hoque** and **Yao-Zhong Zhang**. *N-dimensional superintegrable systems and higher rank quadratic algebras.*

Classical and quantum superintegrable systems have a long history and they possess more integrals of motion than degrees of freedom. They have many attractive properties, wide applications in modern physics and connection to many domains in pure and applied mathematics. We overview two families of superintegrable Kepler-Coulomb systems with non-central terms and superintegrable Hamiltonians with double singular oscillators of type $(n, N-n)$ in N-dimensional Euclidean space. We present their quadratic and polynomial algebras involving Casimir operators of $so(N+1)$ Lie algebras that exhibit very interesting decompositions $Q(3) \oplus so(N-1)$, $Q(3) \oplus so(n) \oplus so(N-n)$ and the cubic Casimir operators. The realization of these algebras in terms of deformed oscillator enables the determination of a finite dimensional unitary representation. We present algebraic derivations of the degenerate energy spectra of these systems and relate them with the physical spectra obtained from the separation of variables. We also discuss cases related to these models involving Abelian and non Abelian monopoles interaction. (Received September 12, 2016)