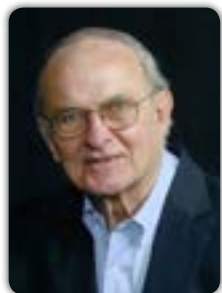


3<sup>rd</sup> International Conference on

# HIGH ENERGY PHYSICS

December 11-12, 2017 | Rome, Italy

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**Group theory, coherent states, and the N-dimensional oscillator**

The isotropic harmonic oscillator in  $N$  dimensions is shown to have an underlying symmetry group  $O(2,1) \times O(N)$  which implies a unique result for the energy spectrum of the system. Raising and lowering operators analogous to those of the one-dimensional oscillator are given for each value of the angular momentum parameter. This allows the construction of an infinite number of coherent states to be carried out. In the  $N=1$  case there is a twofold family of coherent states, a particular linear combination of which coincides with the single set already well known for that case. Wave functions are readily derived which require only the solution of a first order differential equation, an attribute generally characteristic of group theoretical approaches.

**Recent Publications**

1. G S Guralnik, C R Hagen and T W B Kibble (1964) Global conservation laws and massless particles, Phys. Rev. Lett. 13:585.
2. C R Hagen and W J Hurley (1970) Magnetic moment of particle with arbitrary spin, Phys. Rev. Lett. 24:1381.
3. C R Hagen (1984) A new gauge theory without an elementary photon, Ann. Phys.(N.Y.) 157:342.
4. C R Hagen (1990) Aharonov-Bohm scattering of particles with spin, Phys. Rev. Lett. 64:503.
5. C R Hagen (1990) Exact equivalence of spin-1/2 Aharonov-Bohm and Aharonov-Casher effects, Phys. Rev. Lett. 64:2347.

**Biography**

Carl R Hagen received PhD from the Massachusetts Institute of Technology in 1962. He has been with the University of Rochester since 1965 and was named Professor in 1974. He is a fellow of the American Physical Society. He was named an Outstanding Referee by the American Physical Society in 2008 and was awarded the Society's 2010 J. J. Sakurai Prize in theoretical particle physics for "elucidation of the properties of spontaneous symmetry breaking in four-dimensional relativistic gauge theory and of the mechanism for the consistent generation of vector boson masses."

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