ALPHA CLUSTERING IN LIGHT NUCLEI

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In this contribution, I present a discussion of alpha-cluster nuclei in the framework of the Algebraic Cluster Model (ACM). The formalism for the case of two, three and four alpha particles is developed in detail with emphasis on the role played by discrete symmetries. As an example, the ACM is applied to study alpha-clustering states in 12C in which the clusters are located at the vertices of an equilateral triangle with D(3h) symmetry [1], and 16O with the four alpha particles at the vertices of a tetrahedron with T(d) symmetry [2]. The discrete symmetry reflects the underlying geometric configuration of the alpha particles and has important consequences for the structure of rotational bands in alpha-cluster nuclei. For example, for a triangular configuration the ground state band consists of both positive and negative parity states with the sequence L(P)=0(+), 2(+), 3(-), 4(+), 4(-), 5(-), …, just as has been observed recently in 12C [1]. In addition to energy spectra I present some results for electromagnetic form factors and transition rates in 12C and 16O [3].

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