# Rotations as coherent states of SU(6) quadrupole phonons in the SU(3) limit

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Analytic expressions for the wave functions of the ground-state rotational band for even and odd nuclei are derived in terms of spherical quadrupole phonons, truncated at N phonons[1]:

$$|I\rangle_{GSB} = \sum_{n=0}^{N} \sum_{\gamma} A^{norm}_{n\gamma I} \; |n\gamma I\rangle ,$$

$$A_{n\gamma I} = (-)^n \, 2^{n/2} \left( \frac{N!}{n!\,(N-n)!} \right)^{1/2} C^{(n)}_{\gamma I} ,$$

$$b_i = \Big( \sum_{n\gamma} (A_{n\gamma I})^2 \Big)^{-1/2} ,$$

$$C^{(n)}_{\gamma I} = (2I+1)^{1/2} \sum_{I'} \sum_{\gamma'} \langle 2^{n-1} \gamma' I' ; 2 | \} 2^n \gamma I \rangle \begin{pmatrix} 2 & I' & I \\ 0 & 0 & 0 \end{pmatrix} C^{n-1}_{\gamma' I'} ;$$

$$C^{(0)}_{\gamma I} = \delta_{\gamma 0} \delta_{I 0} , \quad C^{(1)}_{\gamma I} = \delta_{\gamma 1} \delta_{I 2} .$$

For $N \to \infty$ we obtain an I-independent asymptotic gaussian distribution of quadrupole phonons as an intrinsic structure of semiclassical rotations.

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1). L.F.Canto and V.Paar, Phys.Lett. 102B (1981).217