"…and propose an additional J^{π} rule for coupled bands, in addition to current rule #37 for other rotational bands (by November 5, 2005)."

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Rule 37:

Previous:

For a well-deformed nucleus when a regular sequence of $\Delta J=2$ (stretched quadrupole) transitions is observed at high spins as a cascade, the sequence may be assigned to a common band with E2 multipolarity for all the transitions in the cascade. A similar but somewhat weaker argument holds for less deformed nuclei where a common sequence of levels is connected by a regular sequence of $\Delta J=2$ (stretched quadrupole) transitions in a cascade.

Revised:

For a deformed nucleus, a regular sequence of gamma-ray transitions can be assigned to a $\Delta J=2$ (decoupled) or a $\Delta J=1$ (strongly-coupled or magnetic-dipole) rotational-band structure with definite spin-parity assignments if:

a) **the spin and parity of at least one level in this band is unambiguously determined; *and***

b) **for $\Delta J=2$ band structures, at least one of the in-band transitions has a well established E2 multipolarity, *or*, for $\Delta J=1$ band structures,**

> i) **at least one of the crossover ($\Delta J=2$) transitions has a well established E2 multipolarity, *or*,**
> ii) **at least one of the stopover ($\Delta J=1$) transitions has a well established M1 (or M1+E2) multipolarity or (for parity-doublet bands) E1 multipolarity; *and***

c) **some other in-band transitions are stretched quadrupole for the $\Delta J=2$ band structures or stretched dipole (or dipole plus quadrupole) for $\Delta J=1$ band structures.**

Rule 38:

Previous:

For near-spherical nuclei, when a regular sequence of $\Delta J=1$ (stretched dipole) transitions is observed at high spins as a cascade, then the sequence may be assigned to a common band with (M1) multipolarity for all the transitions in the cascade. (Cascades of $\Delta J=1$, E1 transitions occur in rare cases of nuclides which show alternating-parity bands or reflection asymmetry.)

Revised:

To be omitted: contained in rule 37.

Rule 39:

Previous:

In the absence of angular distribution/correlation data, a regular sequence of transitions in a cascade may be assigned to a common structure or a band if (a) the low-lying levels of this structure have well established spin and parity assignments and (b) there is good evidence that, at higher energies and spins, the band has not changed in its internal structure due to band crossings or other perturbations.

Revised:

In the absence of angular distribution/correlation data or other supporting arguments, a regular sequence of gamma-ray transitions in high-spin data may be assigned to a common structure or a band with tentative spin-parity assignments if either the bandhead or some other low-lying member of this structure has reasonably well established spin and parity

(move to section of 'weak arguments' as rule #12)