THE DECAY OF COHERENT ROTATIONAL STATES, FORMED IN HEAVY-ION COLLISION

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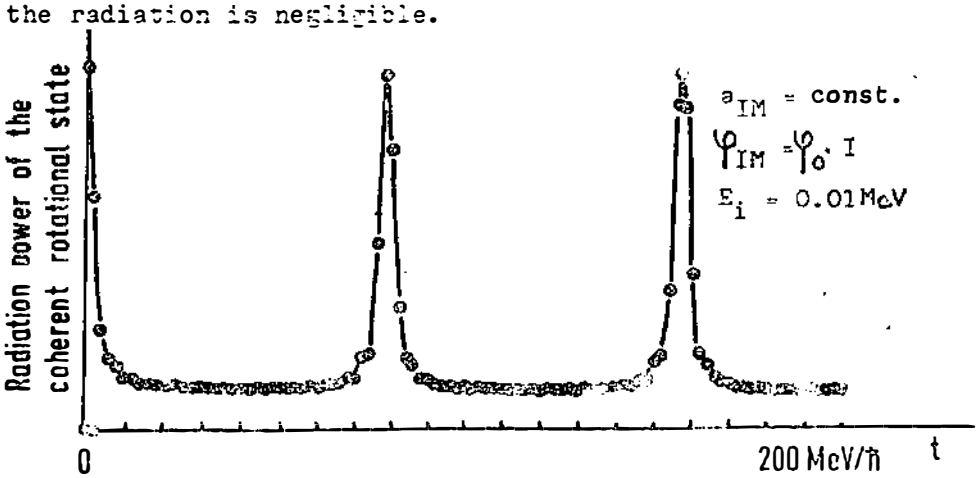
It is shown that under certain conditions in heavy-ion collisions deformed nuclei can be excited into a non-stationary state which is a superposition of several angular momentum eigenstates Φ_{IM}: $\Psi(t)=\sum_{IM} a_{IM}\Phi_{IM} \exp(-iE_i t/\hbar)$.

The state has properties, characteristic of a coherent state:
(i) the absolute values of amplitudes a_{IM} are peaked around a mean value of angular momentum I,
(ii) the phases of amplitudes φ_{IM} ($a_{IM} = |a_{IM}|\, e^{-i\varphi_{IM}}$) are approximately equidistant,
(iii) if the energies E_i of the states Φ_{IM} obey in a good approximation the rule $\sim I(I+1)$, the spontaneus electromagnetic decay of such a stay shows in time strong beatings.

When the phases $\varphi_{IM} + E_i t/\hbar$ are in coherence, the nucleus is well oriented in space, has a large quadrupole moment and radiates strongly. When the coherence disappears, the radiation is negligible.



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