

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

PROPOSAL TO STUDY THE BETA-DECAY PROPERTIES OF EXTREMELY
PROTON-RICH NUCLEI.

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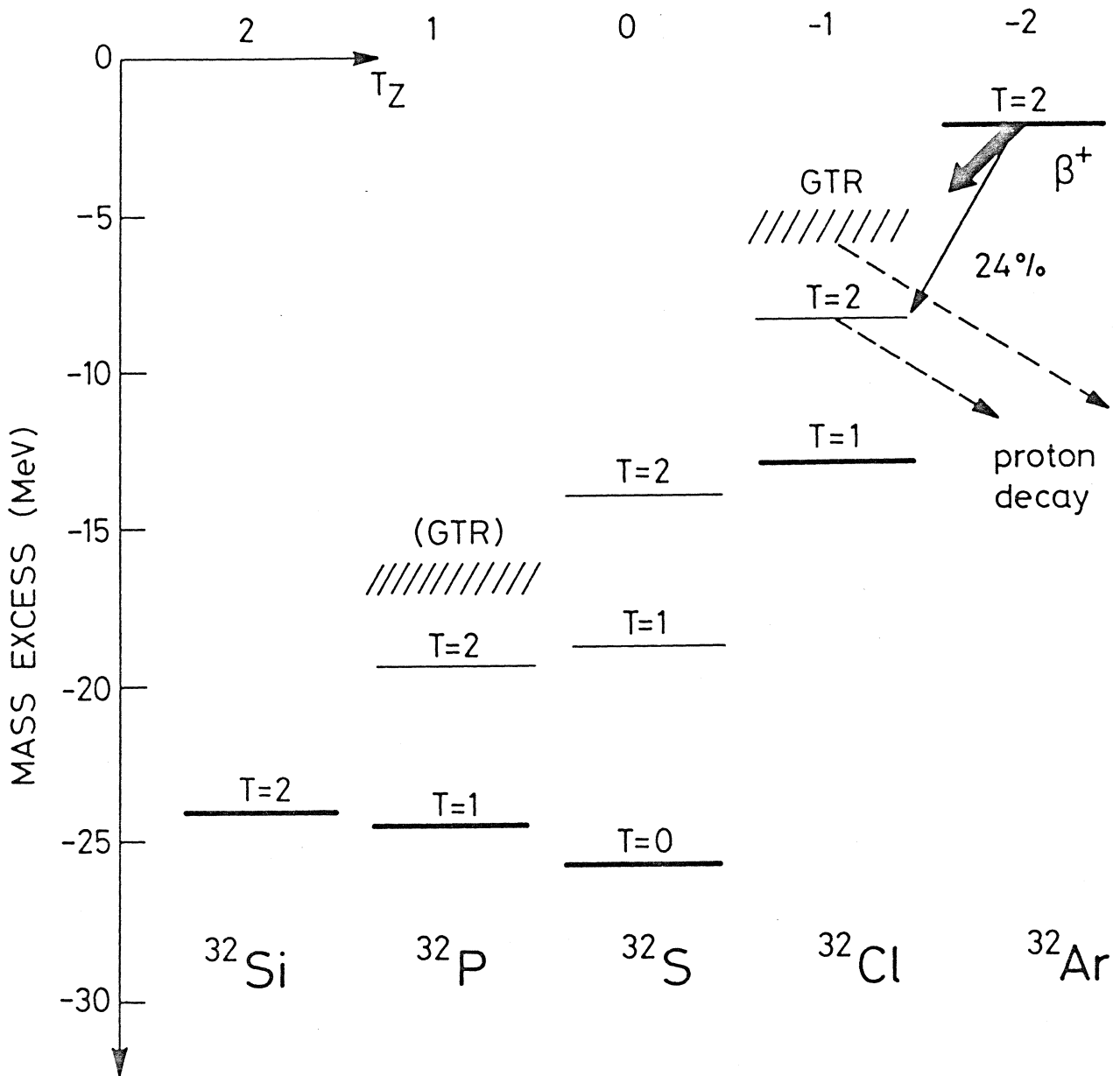
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Abstract:

The most proton-rich nuclei known to date have isospin projections $T_z = -3/2$, -2 and $-5/2$. We propose to carry out a study of their superallowed beta decays, a phenomenon that can only be studied in this region of the nuclear chart. The main aim is to determine the "effective charge" in nuclei of the axial vector coupling, the quantity $(g'_A/g_A)^2$, which in a recent first experiment on a $T_z = -2$ nucleus was determined to be 0.49 ± 0.05 .

Because of the problems connected with the production and acceleration of radioactive ions, our proposal aims at selected elements: neon, argon and rubidium (production runs), magnesium (test and production runs) and calcium (test). We ask for a total of 54 shifts for this project.

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Schematic energy level diagram showing the $T = 0, 1, 2$ states in the nuclei with $A = 32$, $-2 \leq T_z \leq 2$. It is clear why the superallowed beta transitions leading to the $T = 2$ analogue states and to the $T = 1$ Gamow-Teller resonances (GTR) can only be observed in ^{32}Ar .