

IDENTIFICATION OF $T = 2$ ISOBARIC ANALOG STATE IN ^{52}Co AND ITS IMPACT ON THE UNDERSTANDING OF β -DECAY PROPERTIES OF ^{52}Ni

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Mass excesses of ^{52}Co and its (2^+) isomer are directly measured using isochronous mass spectrometry at CSRe. Referring to the β -delayed γ emissions of ^{52}Ni , we identified a new excited state in ^{52}Co and assigned it as the $T = 2$, $J^\pi = 0^+$ isobaric analog state (IAS) of ^{52}Ni . This state is about 130 keV less bound than that suggested previously based on the β -delayed protons of ^{52}Ni . We find that the mass of this IAS together with those of the IAS's in ^{52}Fe , ^{52}Mn , and ^{52}Cr fit well into the Isobaric Multiplet Mass Equation. An interesting finding from this measurement is that the IAS in ^{52}Co decays dominantly via γ transitions while proton emission is almost negligible. This phenomenon could be due to very low isospin mixing according to the large-scale shell model calculations.