SPIN AND PARITY OF THE 2.2-s ISOMER IN ^{70}Br

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We have investigated the beta-decay properties of a 2.2-s isomer in the self conjugate nucleus ^{70}Br, which is the lightest particle-stable isotope of bromine. The isomer was previously observed in a mass-separator study at ISOLDE [4], but except for the half-life, no further properties could be established and its assignment to ^{70}Br was not unambiguous. The observed beta-delayed gamma rays in the decay daughter ^{70}Se, which de-excite the ground-state rotational band, and the deduced beta-decay properties place the isomer firmly in ^{70}Br, and allow a spin- and parity assignment of $J^{\pi} = 5^{+}$.

^{70}Br nuclei in their isomeric state were produced in reactions between a 11O-MeV ^{32}S beam and a 1.19 mg/cm^2 thick ^{40}Ca target. We investigated the decay of the 2.2-s isomer at the recoil mass spectrometer (RMS) in conjunction with the moving tape collector (MTC) and a detection station consisting of four segmented germanium clover detectors in a close geometry around the source spot on the transport tape of the MTC. The observed intensity ratios of known [5] gamma transitions in the beta-decay daughter ^{70}Se in conjunction with simple two quasiparticle shell model considerations lead to a $J^{\pi} = 5^{+}$ assignment for the isomeric level. The interpretation of the deduced J^{π} value in a deformed shell model picture allows the important conclusion that ^{70}Br is a spherical or almost spherical nucleus with $\beta_2 \approx 0$. As such it marks the “northeastern” border of sphericity induced by the doubly magic shell closure at ^{56}Ni.

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