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Low-lying states in ^{32}Mg studied by proton inelastic scattering SATOSHI TAKEUCHI, RIKEN Nishina Center, R377N COLLABORATION — Low-lying excited states in the neutron-rich nucleus ^{32}Mg were studied by proton inelastic scattering in inverse kinematics via an in-beam γ-ray spectroscopy technique. Populated states were identified by measuring de-excitation γ rays, in which five new states were found by $\gamma - \gamma$ coincidence analyses. The differential cross sections were analyzed by using coupled-channel calculations to determine the transferred angular momenta and the amplitudes of individual transitions. The spin and parity of the 2321-keV state was assigned as 4^+. The ratio between the energies of the 2^+ and 4^+ states indicates that ^{32}Mg is a transitional nucleus rather than an axially deformed rigid rotor. A candidate for the 3^- state was found at an excitation energy of 3115 keV, which is lower than the 3^- energies in other N = 20 isotones. A small B(E3) value of 0.6 W.u. suggests a single-particle nature. The collectivities in the nucleus ^{32}Mg with N = 20 are discussed based on the results obtained in the present experiment.

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