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Cluster structure and excitation strengths in ^{11}B T. KAWABATA, Center for Nuclear Study, University of Tokyo, H. AKIMUNE, Department of Physics, Konan University, Y. FUJITA, Department of Physics, Osaka University, H. FUJITA, M. FUJIWARA, K. HARA, K. HATANAKA, M. ITOH, K. NAKANISHI, Y. SHIMBARA, A. TAMII, M. UCHIDA, H.P. YOSHIDA, M. YOSOI, Research Center for Nuclear Physics, Osaka University, Y. KANADA-E'NYO, Yukawa Institute for Theoretical Physics, Kyoto University, S. KISHI, H. SAKAGUCHI, S. TERASHIMA, Y. YASUDA, Department of Physics, Kyoto University, T. WAKASA, Department of Physics, Kyushu University — The ^{11}B(^{3}He, t), ^{11}B(d, d'), and ^{11}B(p, p') reactions were measured at forward scattering including zero degrees. Combining the experimental results from the three reactions, the isoscalar and isovector spin-flip M1 strengths were successfully determined for the low-lying states in ^{11}B. The proton and neutron quadrupole excitation strengths were also deduced from the ^{11}B(d, d') results and previously measured γ- decay widths. The obtained excitation strengths were compared with the shell model and antisymmetrized molecular dynamics calculations. It was found that the $3/2^-_3$ state in ^{11}B has a cluster structure. This state is considered to be an analog state of the 0^+_2 state in ^{12}C which is a well-known 3α cluster state. For the $5/2^-_3$ state, both the shell-model-like and cluster-like structures were observed.

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