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Clustering and deformation in 40Ca

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We have studied clustering and deformations in ^{40}Ca using the antisymmetrized molecular dynamics (AMD) and generator coordinate method (GCM).
The GCM basis are obtained by energy variation with two kinds of constraints for clustering and deformations, respectively.
Superposing obtained wave functions, which form mean-field-type, α-^{36}Ar, and ^{12}C-^{28}Si structures, we obtain normal-deformed (ND), superdeformed (SD), and α-^{36}Ar higher nodal states.
We find that main components of the ND and SD states form triaxial shapes and the $K^\pi = 2^+$ side bands for the ND and SD states exist due to the triaxiality.
Quadrupole electric transition strength $B(E2)$ and moments of inertia for intraband agree with experimental data.
We find that ND and SD state contain α-^{36}Ar and ^{12}C-^{28}Si cluster structure component, respectively.
α-^{36}Ar higher-nodal states is obtained owing to excitation of inter-cluster motion between α and ^{36}Ar clusters in ND state.
This results suggest that clustering correlations are important for mechanism of excitations in medium-weight nucleus.

Primary author: TANIGUCHI, Yasutaka (Kyoto Univ. (-March, 2008))

Co-authors: HORIUCHI, Hisashi (Research Center for Nuclear Physics, Osaka Univ.); KIMURA, Masaaki (Hokkaido Univ.); KANADA-EN'YO, Yoshiko (Yukawa Institute for Theoretical Physics, Kyoto Univ.)

Presenter: TANIGUCHI, Yasutaka (Kyoto Univ. (-March, 2008))

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