

Superdeformation and alpha -cluster structure in ^{35}Cl

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A superdeformed (SD) band has been identified in a non - alpha - conjugate nucleus ^{35}Cl . It crosses the negative parity ground band above $11/2^-$ and becomes the yrast at $15/2^-$. Lifetimes of all relevant states have been measured to follow the evolution of collectivity as well as formation of a cluster structure. Energetics as well as enhanced $B(E2)$ and $B(E1)$ values provide evidences for superdeformation as well as its relation to parity doublet cluster structure for the first time in $A \approx 40$ region. Large scale shell model calculations assign $(sd)^{16}(pf)^3$ as the origin of these states. Calculated spectroscopic factors also correlate the SD states in ^{35}Cl to those in ^{36}Ar .