Collective excitations in ^{106}Cd *

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The Cadmium isotopes are situated in a very interesting region of the nuclear chart. The *Z=50* region is very favorable for nuclear structure studies due to the large abundance of stable isotopes, so that a quasi complete study of a long chain is feasible. These nuclei have been intensively studied in the last decades and have revealed a wealth of information on multiphonon states and their interaction with intruding states, leading to shape coexistence of spherical normal and deformed 2p-2h intruder states[1]. Beside the symmetric coupling of the quadrupole excitations of the valence protons and neutrons $Q_s = N(Q_p + Q_n)$ with the structure $|2^+ >= Q_s|0^+ >$, a partially asymmetric coupling results in the mixed symmetry (ms) quadrupole operator $Q_{ms} = \alpha Q_p - \beta Q_n$ with the structure $|2^+_{ms} >= Q_{ms}|0^+ >$. Furthermore, the nature of negative parity states, especially the inhomogenous phonon coupling of the octupole vibration to the quadrupole vibration leading to quadrupole-octupole coupled (QOC) states $(2^+ \otimes 3^-)^{J^\pi}$ with $J^\pi = 1^-, 2^-, 3^-, 4^-, 5^-$, was studied in most even-even cadmium isotopes. These different phonon excitations were investigated in ^{106}Cd using various measurements (inelastic neutron scattering (INS), nuclear resonance fluorescence(NRF)[2], $\gamma\gamma$ angular correlation). We present new data on ^{106}Cd and discuss the results related to the evolution of collective excitations in the Cadmium chain.

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