Search for Octupole Fragmentation in ^{130}Ba ◊

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The small fragmentation of the low energy octupole state in ^{134}Ba [1], which has been shown to be consistent with a U(5) → SU(3) structure, contrasts with the large octupole fragmentation in the O(6) (γ-soft) nuclei ^{194,196,198}Pt [2,3]. It has raised the question of whether the octupole fragmentation in lighter Ba isotopes is also small or is larger, showing a transition to the expected O(6) structure [4].

The behavior of the low energy octupole state in ^{130}Ba was examined using deuteron inelastic scattering at 25 MeV at the Munich tandem laboratory. The scattered deuterons were analyzed with the Q3D - magnetic spectrograph and detected with the high resolution focal plane detector. The isotopically pure 90 μg/cm^2 target was prepared at the PARIS isotope separator by implantation of magnetically separated Ba ions in a C-foil. The data were taken in steps of 3° from 17° to 35° lab angles. The 7-8 keV FWHM energy resolution allows the study of about 20 states up to 3.5 MeV excitation energy, with several octupole candidates. The data analysis is still in progress.

The deuteron spectrum in the energy range between 1.5 and 3.5 MeV, which is shown in fig. 1, includes a strong peak corresponding to the lowest 3$^-$ state at 1948 keV. A few other peaks at higher excitation energy are observed. If they are 3$^-$ states, the octupole fragmentation in ^{130}Ba is larger than that in ^{134}Ba. This would show that a U(5)→O(6) transition takes place just below N=82 in the Ba isotopes.

References

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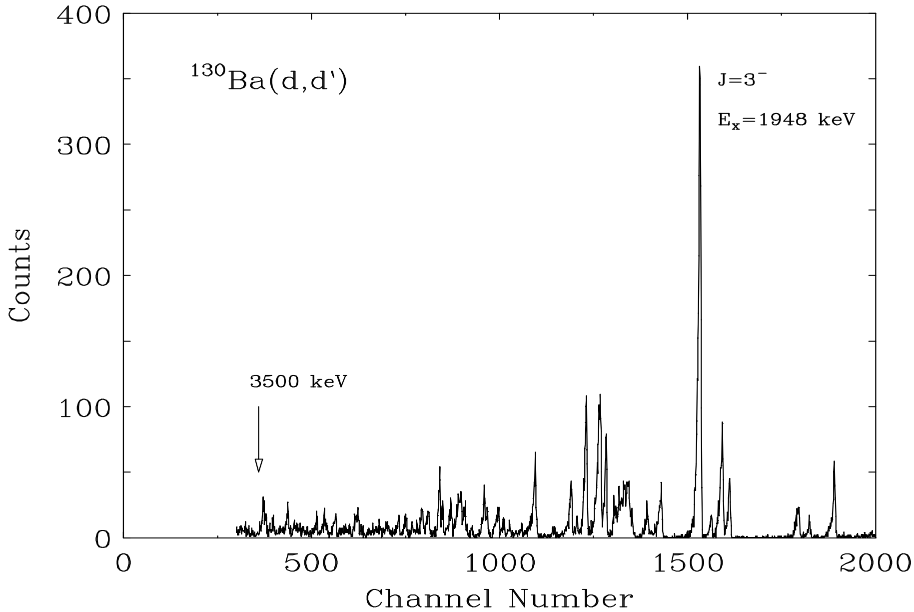

Fig. 1: Deuteron spectrum for an excitation energy range of 1.5 to 3.5 MeV taken at 32°

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