

3. Isomeric states in $^{118},^{120},^{122}\text{Cs}$

Previously known half-lives of ^{118}Cs (16 sec.), ^{120}Cs (60 sec.) and ^{122}Cs (21 sec. + 4 min.) were confirmed from our decay studies. No other $^{118},^{120},^{122}\text{Cs}$ activity with half-life greater than 5 sec. was observed. However, the population of the g.s. band in $^{118},^{120}\text{Xe}$ (see next section) seems to be inconsistent with the decay of only one state in $^{118},^{120}\text{Cs}$. As a matter of fact, these ground state bands are populated up to 8^+ with decreasing intensities. Moreover, it has been found that the spin of the main component of the ^{120}Cs activity produced at ISOLDE is two $5)$ which is in disagreement with the direct feeding of the 8^+ g.s. state. This situation could be explained by the existence of two isomeric states with similar half-lives in $^{118},^{120}\text{Cs}$. At ISOLDE the relative population of such isomers favor a low spin component due to the initial proton interactions. In spite of a careful examination, no evidence for a half-life difference between the decays of the g.s. band transitions could be obtained, due to the low statistics of transitions connecting high-spin levels.

4. The $^{118},^{120},^{122}\text{Xe}$ level schemes.

Discussion

Level schemes based on available experimental evidence have been built including the most intensive transitions of the decays. In addition to the g.s. band, evidence for the quasi-gamma band was obtained for every nucleus. Those bands are presented in the figure in a systematic fashion including the levels of $^{124},^{126}\text{Xe}$ data from reference 1). We can notice the slight

decrease in the energies of the levels of the g.s. band from ^{126}Xe to ^{120}Xe . On the other hand, the 2^+_g and 4^+_g energies are increasing for ^{118}Xe . According to Batsch et al.⁶⁾ this trend may be confirmed in ^{116}Xe (possible 2^+ , 4^+ and 6^+ levels located at 393, 918 and 1514 keV). The examination of the quasi g.s. band is of interest. The small level spacing between the 3^+_g and 4^+_g levels especially in $^{118},^{120}\text{Xe}$ could be indicative of softness. The inversion at ^{122}Xe between the 4^+_g and 2^+_g levels is possibly an indication of a phase transition between prolate and oblate shapes. A number of other levels have been found. In particular it should be noted the existence of a quasi-beta band in ^{118}Xe and ^{120}Xe with band heads situated respectively at 830 and 908 keV. A complete report on this study will be published.

References

- 1) M. Sakai, Proceedings of Conference on problems of vibrational nuclei, Zagreb, (1974) ;
H. Kusakari et al., Nucl. Phys. A242 (1975) 13.
- 2) Nuclear Data Sheets, 17, N° 1 (1976).
- 3) F. Bozek et al., private communication.
- 4) J.T. Routti, rapport UCRL-19452 (1969).
- 5) C. Ekström, private communication and contribution to this conference.
- 6) T. Batsch et al., contribution to this conference.

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