

Monopole Strength Distributions in Sn Isotopes

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The isotopic dependence of the energy of the giant monopole resonance(GMR) could give us information on the symmetry term in the nuclear equation of state. There were several measurements in the Sn isotopes 15 to 20 years ago(summarized in ref. 1) with relatively large

high energy tail was identified[2] on the GMR distribution that dramatically altered the centroid. Hence we have studied the giant resonance regions of $^{112}, ^{116}, ^{124}\text{Sn}$ with inelastic scattering of 240 MeV α particles to small angles and applied recently developed analysis

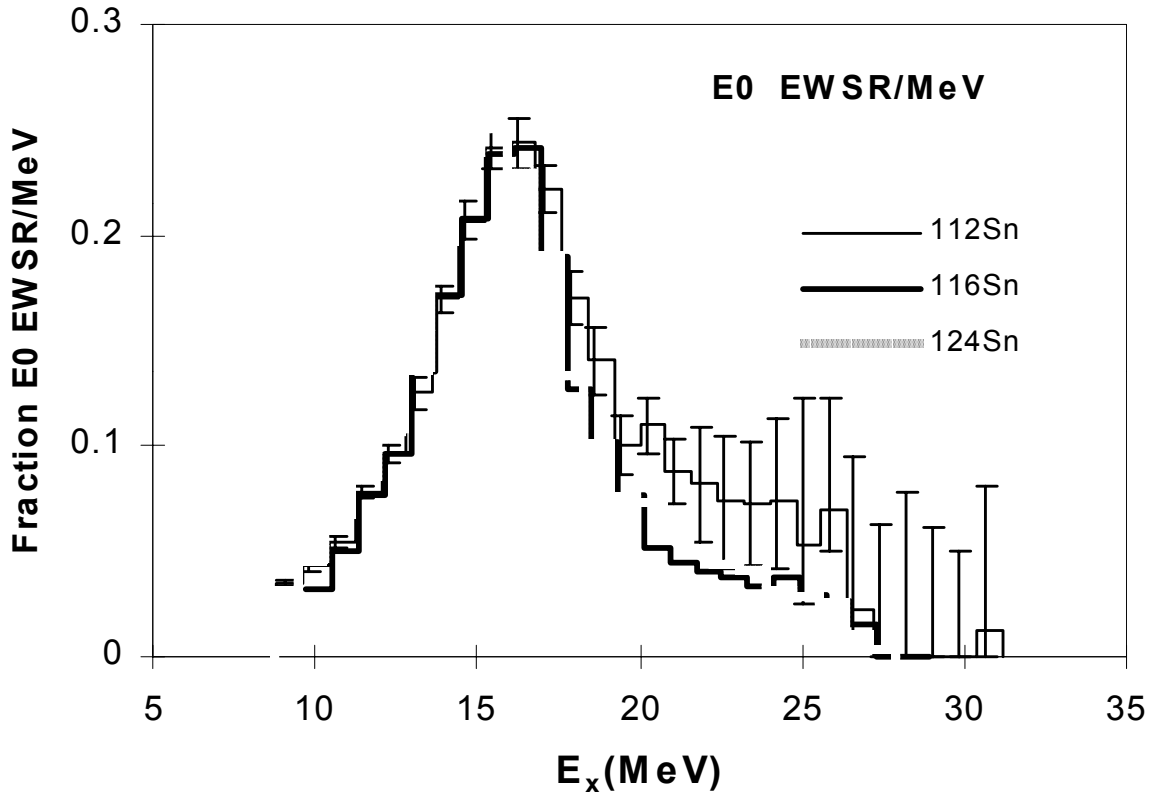


Figure 1: The E0 EWSR/MeV obtained is shown for 3 Sn isotopes. The error bars for ^{112}Sn are shown. Those for the other isotopes are comparable.

error bars, but experimental technique has improved dramatically in the last few years. In addition, the analysis of these early measurements assumed all of the strength to be concentrated in a Gaussian shaped peak, and the centroid of that peak was taken as the centroid of GMR strength. We can now obtain the actual strength distribution, and in particular for ^{90}Zr a

techniques[3] that allow a more systematic analysis and provide multipole distributions with better resolution. The E0 strength distributions obtained are shown in Figure 1, where it can be seen that a small high energy tail is present in all three nuclei though it is most prominent in ^{112}Sn . Figure 2 shows a comparison of the present and earlier[1] results. The earlier results have been

adjusted to account for the difference between the centroid of the cross section (reported prior to 1995 as the centroid of the E0 strength) and the actual centroid of the E0 strength[2]. It can be seen that the position of the Gaussian peak in this work is in excellent agreement with the earlier measurements, but in particular for ^{112}Sn , the centroid of the entire strength is at considerably higher excitation energy due to the large high energy tail.

References

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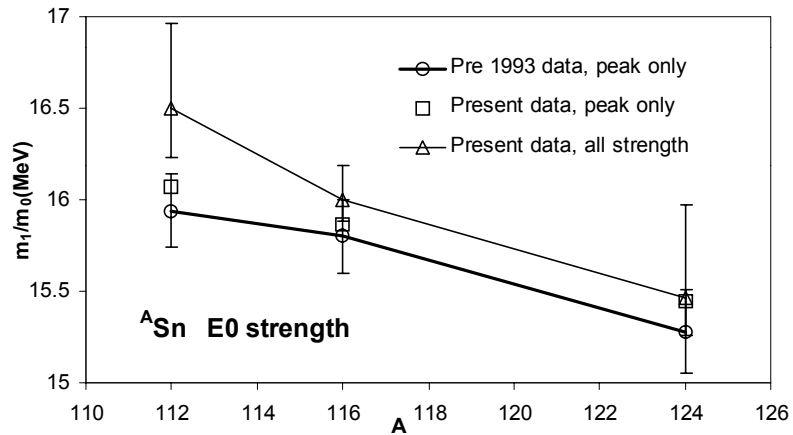


Figure 2: Centroids of strength obtained for 3 Sn isotopes are shown.