

# Isvector deformation and its link to the neutron shell closure

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Semi-microscopic analysis of the inelastic  $^{18-22}\text{O}(p, p')$  and  $^{30-40}\text{S}(p, p')$  scattering data measured at medium energies has been performed using a compact approach [1] developed recently for the determination of the isoscalar ( $\beta_0$ ) and isovector ( $\beta_1$ ) deformation parameters of the low-lying ( $\Delta S = \Delta T = 0$ ) nuclear excitations induced by the inverse kinematics proton scattering. Our results give an accurate estimate of  $\beta_0$  and  $\beta_1$  for the low-lying excited states in neutron-rich Oxygen and Sulfur isotopes. Quite strong isovector mixing was found in several cases, like the  $2_1^+$  state in  $^{20}\text{O}$  where the isovector deformation  $\beta_1$  is larger than the isoscalar deformation  $\beta_0$  by a factor of 2 to 2.5. We have thus confirmed the relation  $\beta_1 > \beta_0$  which can be anticipated from the core polarization by the valence neutrons in neutron-rich nuclei. The indication of possible neutron-shell closure around  $N = 14$  is also discussed based on our folding analysis of the recent  $^{22}\text{O}(p, p')$  data measured at GANIL [2].

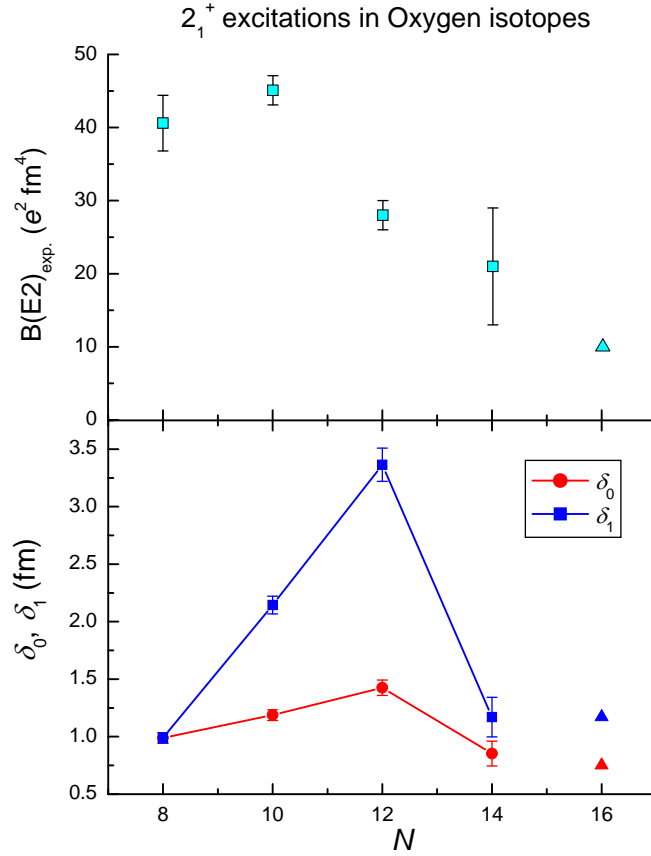


Figure 1: The measured  $B(E2)$  transition strength (upper part) and isoscalar and isovector deformation lengths deduced from our DWBA analysis (lower part) for  $2_1^+$  states in the Oxygen isotopes. Triangles are the estimates of these quantities based on the QRPA prediction [3] for the  $2_1^+$  state in  $^{24}\text{O}$ .

[1] D.T. Khoa, Phys. Rev. **C68**, 011601(R) (2003).

[2] E. Becheva *et al.*, Phys. Rev. Lett. **96**, 012501 (2006).

[3] E. Khan, N. Sandulescu, M. Grasso and N. Van Giai, Phys. Rev. **C66**, 024309 (2002).