

B(E2) Transition Strengths of Neutron-rich Carbon Isotopes in a Seniority Scheme *

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Neutron-rich Carbon isotopes, experimentally accessible up to the drip line, provide a unique ground to systematically examine spectroscopic information in search for exotic new phenomena.

Of particular interest, is the understanding of how proton and neutron degrees of freedom are coupled near the drip line.

Lifetime measurements in $^{16,18,20}\text{C}$ isotopes, using the RDDS method, have been recently carried out at NSCL [1,2], and provide important information about the structure of these nuclei.

In this work we attempt to interpret the derived B(E2) transitions strengths in terms of a seniority inspired scheme [3]. The semi-empirical analysis shows an important role played by proton excitations, driven by the effective reduction of the $\pi p_{3/2}$ - $\pi p_{1/2}$ spin-orbit splitting. This is due to the effect of the tensor component of the nuclear force [4], similar to the situation seen in the $^{89-95}\text{Y}$ isotopes[5].

This simple approach allows us to make predictions about spectroscopic factors for proton removal reactions and magnetic moments of the 2_1^+ states that can be tested experimentally.

References

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