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## Single-particle structure of <sup>17</sup>C

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The shell structure of stable and near-stable nuclei and the associated magic numbers are key elements in nuclear structure. It has been demonstrated, however, over recent years that the traditional magic numbers evolve when nuclei far from stability are explored. For example, recent experiments [1-3], including transfer studies by the TIARA collaboration at GANIL [4-6], have provided evidence to support the existence of a shell closure at N=16 in neutron-rich neon and oxygen isotopes associated with the vanishing of the N=20 shell gap. This has been understood as arising from the effects of the monopole part of the nucleon-nucleon interaction [7,8]. However, in the neutron-rich carbon isotopes, the extent to which the gap persist at N=16 is unclear. In an effort to answer this question we have attempted to probe the low-lying level structure of  $^{17}C$  using the  $^{16}C(d,p)^{17}C$  transfer reaction in inverse kinematics to locate the neutron single-particle orbitals involved in the formation of the N=16 shell gap. Of particular interest is the neutron 0d3/2 orbital, the spectroscopic strength of which is expected to be carried by unbound states.

The experiment was carried out at the GANIL facility. A pure secondary beam of <sup>16</sup>C at 17.2 AmeV produced by fragmentation in the LISE3 spectrometer was used to bombard a CD2 target. The light ejectiles were detected using with the TIARA and MUST2 silicon (Si) strip arrays while a Si-Si-CsI telescope was placed at zero degrees to identify beamlike residues. In addition, four HPGe-EXOGAM clover detectors were used to measure the gamma-rays arising from <sup>17</sup>C bound excited states.

The detailed goals of the experiment, the setup, the results of the analysis and a first interpretation will be discussed in this presentation.

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