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Nuclear structure research at Australia's Heavy Ion Accelerator Facility: Electromagnetic properties and emerging collectivity in atomic nuclei

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Some highlights of nuclear structure research at Australia's Heavy Ion Accelerator Facility will be discussed. Mapping the emergence of nuclear collectivity is a focus, through g-factor and $B(E2)$ measurements. For example, such measurements on the Te isotopes allow us to map the pathway from the proton $g_{7/2}$ seniority structure in semimagic ^{134}Te toward collective excitations near mid-shell as successive pairs of neutrons are removed. It is found that collectivity does not emerge suddenly, with the nucleus becoming collective as a whole, as might be inferred by examining energy patterns, such as $R_{4/2}$ energy ratios, alone. Rather, the 2^+ states become collective first whereas the first 4^+ and 6^+ states retain a significant seniority structure. This behaviour is not unique to the Te isotopes. The meaning of the term "pre-collective" nuclei will be discussed.

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