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Measuring transitional matrix elements using first-order perturbation theory in Coulomb excitation

The low-energy structure of the stable light nucleus 20Ne has been examined using Coulomb excitation at the TRIUMF Facility in Vancouver, Canada. The highly-efficient and segmented TIGRESS HPGe gamma-ray array permits accurate Coulomb-excitation studies of the high-lying 2ˆ+ state found in 20Ne. Beams of 20Ne(5+) at approximately 1.7x10ˆ7 ions/s were accelerated to 3.235 MeV/u and bombarded onto a 1.56 mg/cmˆ2 110Pd target. Six TIGRESS HPGe clover detectors covering approximately 19% of 4(pi) were used to detect the gamma rays emitted in the de-excitation of the levels populated in beam and target nuclei, while scattered ions were detected using annular double-sided, CD-type silicon detector. The angular coverage of the silicon detector allows for a clean measurement of transitional matrix elements without second-order effects such as static quadrupole moment and nuclear polarizability.

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