

Characterising the Pelletron at the University of Melbourne

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The Pelletron at the University of Melbourne has been used for materials analysis and ion implantation since its installation in the 1970s. Today, it is primarily used to produce proton and helium beams up to 3.5 and 1.5MeV respectively, serving three beamlines via a rotating spectrometer magnet. Although the approximate beam current and transverse profile can be measured using the in-built rotating wire scanners and Faraday Cups, neither the beam stability nor transverse distributions have been previously investigated or measured in detail. Using only the diagnostics already installed in the beamlines, we have performed systematic measurements to determine the beam current variation over timescales ranging from milliseconds to hours, leading to increased beam stability with changes to the operating Pelletron settings. In addition, we have performed initial beam distribution measurements using a custom-built slit-grid apparatus. Our beam characterisation techniques could provide a low-cost method to probe parameters of the beam for improvements in the operation and efficiency of similar accelerators.

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