A CSIRO-MARC high excitation quintuplet system on a high brightness accelerator

C. G. Ryan[1,2], D. N. Jamieson[2], R. Szymanski[2], P. Reichert[2]

[1]CSIRO Division of Exploration and Mining, Bayview Avenue, Clayton VIC 3168, Australia
[2]Microanalytical Research Centre, School of Physics, University of Melbourne, VIC 3010, Australia

In early 2004 the CSIRO-MARC high excitation magnetic quadrupole quintuplet microprobe system was moved from the Sydney General Ionex Tandetron to the Melbourne 5U Pelletron accelerator. This was done to take advantage of the highly collimated beam from the 5U Pelletron which offers a factor of 10 higher brightness (up to 15 pA/($\mu m^2 mr^2 MeV$)) compared to the Tandetron. When fully commissioned, it is anticipate that this high brightness will offer a factor of ten increase in the probe current density which was already over 3 nA/μm^2 on the Tandetron [1]. This is the current state of the art for high intensity probes and the aim is for even higher performance on the Pelletron accelerator. This offers the potential of improved spatial resolution at standard probe currents which are typically 1 nA for fluid inclusion analysis and 10 nA for mineral imaging by proton induced x-ray emission with 3 MeV protons. Examples illustrating applications in geology and synergy with synchrotron approaches will also be presented.