

Abstract Submitted  
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**Doppler-broadened lineshapes from Coulomb-excitation of fast fragment beams: implications for  $g$ -factor and lifetime measurements** ANDREW STUCHBERY, The Australian National University, ANDREW DAVIES, NSCL Michigan State University — Doppler-broadened lineshapes were observed in a recent measurement of the  $g$  factor of the first  $2^+$  state in  $^{38}\text{S}$  (see the contribution of A.D. Davies *et al.*). Beams of the neutron-rich isotope were produced by fragmentation and delivered at 40 MeV/nucleon onto a target consisting of Au and Fe layers, 355 mg/cm<sup>2</sup> and 110 mg/cm<sup>2</sup> thick, respectively. The beam ions were Coulomb excited and subjected to the transient field during transit through the Fe layer. Since the transit time through the target layers is of the order of the lifetime of the  $2^+$  state (5 ps), about half of the nuclei decay whilst slowing in the target. The gamma-ray spectra therefore show Doppler-broadened lines. A computer code has been developed to interpret and analyze these lineshapes. The implications for the  $g$ -factor measurement and the potential for future applications to lifetime measurements will be discussed.

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