Modelling scattering and resonances of weakly-bound radioactive nuclei

P.R. Fraser,1,2 L. Canton,1 K. Amos,2 S. Karataglidis,3 J.P. Svenne,4 and D. van der Knijff2

1Istituto Nazionale di Fisica Nucleare, Sezione di Padova, Padova I-35131, Italia
2School of Physics, University of Melbourne, Victoria 3010, Australia
3Department of Physics, University of Johannesburg, P.O. Box 524 Auckland Park, 2006, South Africa
4Department of Physics and Astronomy, University of Manitoba, and Winnipeg Institute for Theoretical Physics, Winnipeg, Manitoba, Canada R3T 2N2

For a theoretical description of weakly-bound systems studied with radioactive ion beams, it is important to make allowance for low–lying collective–type excited states of the colliding bodies which are not stable levels, but rather particle emitting resonances. This work describes one such implementation in the framework of a multi-channel algebraic scattering formalism for determining nucleon–nucleus cross sections and spectra at low energies. Results obtained thus far are surveyed [1–3], and future expansions to the scope of the method outlined (for instance, see Ref. [4]).