

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

¹*Istituto Nazionale di Fisica Nucleare, Sezione di Padova, Padova I-35131, Italia*

²*School of Physics, University of Melbourne, Victoria 3010, Australia*

³*Department of Physics, University of Johannesburg,
P.O. Box 524 Auckland Park, 2006, South Africa*

⁴*Department 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]).

[1] P. Fraser *et al.*, Phys. Rev. Lett. **101**, 242501 (2008).

[2] P.R. Fraser *et al.*, Rev. Mex. Fís **57**, 20 (2011).

[3] K. Amos *et al.*, Nucl. Phys. A **879**, 132 (2012).

[4] L. Canton *et al.*, Phys. Rev. C **83**, 047603 (2011).