

TALENT Course 6: Theory for exploring nuclear reaction experiments

Outline project proposal

Project name: Knockout reactions from neutron-rich projectiles

Researcher(s): Tomokazu Miyamoto

Affiliation: CNRP, Department of Physics, University of Surrey, Guildford, UK

Supervisor(s): J.A. Tostevin

Project outline and aims:

The purpose of this project is to reproduce the theoretical calculations of Physical Review C 86, 054604 (2012) and to deepen the understanding of knockout reactions of a weakly-bound projectile in a relatively moderately high energy region (in this case between 50 and 300 MeV / nucleon).

Methodology:

Removal reaction cross sections and parallel momentum distributions will be calculated through the eikonal model. A stable nucleus, like Carbon-12, is chosen as a target, assuming that such a target is described by a Gaussian density. Carbon-22 can be used as a projectile. The structure near the unbound ground state of Carbon-21 is analysed through the removal reaction.

Key references:

1. N. Kobayashi, T. Nakamura, J.A. Tostevin et al. Phys.Rev.C 86 054604 (2012)
2. J.A. Tostevin, G. Podolyak et al. Phys.Rev.C 70 064602 (2004)