

# 670<sup>th</sup> ASRC Seminar

Date: Thursday, March 9, 13:30 ~ 15:00

Location: Room 302, ASRC bldg.

Speaker: Prof. Jeffrey Tostevin

Tokyo Institute of Technology and University of Surrey, UK

Title: Using Complementary Direct Reaction  
Mechanisms to Enhance

Nuclear Spectroscopic Information

**Abstract:** Nuclear reactions where single nucleons are added or removed from a nuclear species are used to understand and quantify the active nucleon single-particle states near the Fermi-surface(s) of the nucleus – and hence the evolution of nuclear structure with  $N$  and  $Z$ . The mass and energy of the projectile beam and the available observables then dictate the reaction's sensitivity to the active orbitals of the transferred particle. In the case of light, very neutron-rich light nuclei, exploiting the different sensitivity of the nuclear and Coulomb breakup mechanisms has proved to be a powerful technique [1]. Use of the fast single-nucleon removal reaction (which can access nucleons at both weakly- and well-bound Fermi surfaces) to study the differences between neighbouring nuclei has also revealed novel structure features– such as for  $^{34}\text{Si}$  [2]. For the spectroscopy of medium mass systems, single-nucleon pick-up reactions in inverse kinematics on a light target nucleus, combined with modern  $\gamma$ -ray tracking detectors, can also be used to better-select and characterise states with large orbital angular momentum [3]. If used in combination with the fast single-nucleon removal reaction [4], the spectrum of final states is populated very differently and can be examined more fully. This talk will review these reaction mechanisms, including these recent applications.

[1] N. Kobayashi et al. *Phys. Rev. C* 93, 014613 (2016). [2] A. Mutschler et al., *Nature Physics* 13, 152–156 (2017). [3] A. Gade et al. *Phys. Rev. C* 93, 031601(R) (2016). [4] A. Gade et al. *Phys. Rev. C* 93, 054315 (2016).

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