

# Nuclear Structure Research at TRIUMF

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**for the  $8\pi$  and TIGRESS collaborations**

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The radioactive beam laboratory at TRIUMF is currently the highest power ISOL facility in the world. Taking advantage of the high-intensity radioactive beams, major programs in nuclear astrophysics, nuclear structure, and weak interaction studies have begun. The low-energy area, ISAC-I, is capable of delivering beam up to mass 30 at  $\approx 1.5$  MeV/u, whereas ISAC-II will ultimately provide beams up to mass 150 and  $\approx 6.5$  MeV/u. Major spectrometers for nuclear structure research consist of the  $8\pi$  spectrometer at ISAC-I, the TIGRESS spectrometer now being installed for ISAC-II, and the EMMA recoil mass separator currently being designed. The  $8\pi$  spectrometer, consisting of 20 Compton-suppressed germanium detectors and various auxiliary devices, has been transformed from a array focused on high-spin studies into the world's most powerful device dedicated to  $\beta$ -decay measurements. Many improvements in the spectrometer have been made, including a highly precise and high-throughput data acquisition system, the installation of a moving tape collector, incorporation of an array of 20 plastic scintillators for  $\beta$ -particle tagging, 5 Si(Li) detectors for conversion electrons, and 10 BaF<sub>2</sub> detectors for fast-lifetime measurements. Experiments can now be performed where data from all ancillary detectors can be collected simultaneously, resulting in a very detailed view of nuclear structure through  $\beta$ -decay. The TIGRESS array will consist of twelve 32-fold segmented large-volume clover detectors and also various auxiliary detectors including a CsI array, Si-detector arrays, and a neutron detector array. A programme of Coulomb excitation studies using TIGRESS has just been initiated. A powerful future combination will be TIGRESS coupled to EMMA that will allow a programme of single-nucleon transfer, fusion reactions, etc., to be performed.

Results from recent experiments with the  $8\pi$  and TIGRESS, including  $\beta$ -decay of nuclei near  $N = 90$  and Coulomb excitation of  $^{21}\text{Na}$ , will be presented that highlight the capabilities of the spectrometers.