

**Accelerator Laboratory**

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**Established:** 1975

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**Purpose:** The accelerator laboratory serves as a research and teaching tool of the faculty of the ECU Department of Physics

**Capabilities:** The primary instrument is a 2 MV tandem Van de Graaff positive-ion accelerator providing ion beams of protons, lithium, carbon, fluorine, etc., with energies from 0.5 to 10 MeV. Instrumentation is available to conduct detailed studies of ionization, excitation, and charge transfer that occur in ion-atom, ion-molecule and ion-surface interactions. These studies include measurement of the energies and angles of emission of electrons from atoms, molecules, and surfaces, as well as their absolute cross sections and/or yields of productions for different incident ions. Capabilities are also available for the analysis of trace elements concentrations by means of proton induced x-ray emission (PIXE) analysis. PIXE studies have been actively incorporated in collaborative studies with several academic departments across ECU including Anthropology, Biology, Geology, and Radiation Oncology.

Data Acquisition and analysis systems include x-ray and charged particle detectors, vacuum systems and vacuum monitoring equipment, computer data acquisition and analysis software and associated electronic components.

The accelerator laboratory also has the services of a machine shop and electronics shop for development of the specialized equipment needed to conduct accelerator based research.

**Instrumentation:**

2 MV Tandem Van de Graff accelerator with Middleton ion source capable of producing ions over a wide range of species.

Proton-induced x-ray emission analysis (PIXE)

Spectrometers and detectors for charged particles, VUV, x-rays and gamma rays

CAMAC, NIM, and PC-based data acquisition and analysis electronics and software

High and ultrahigh vacuum systems