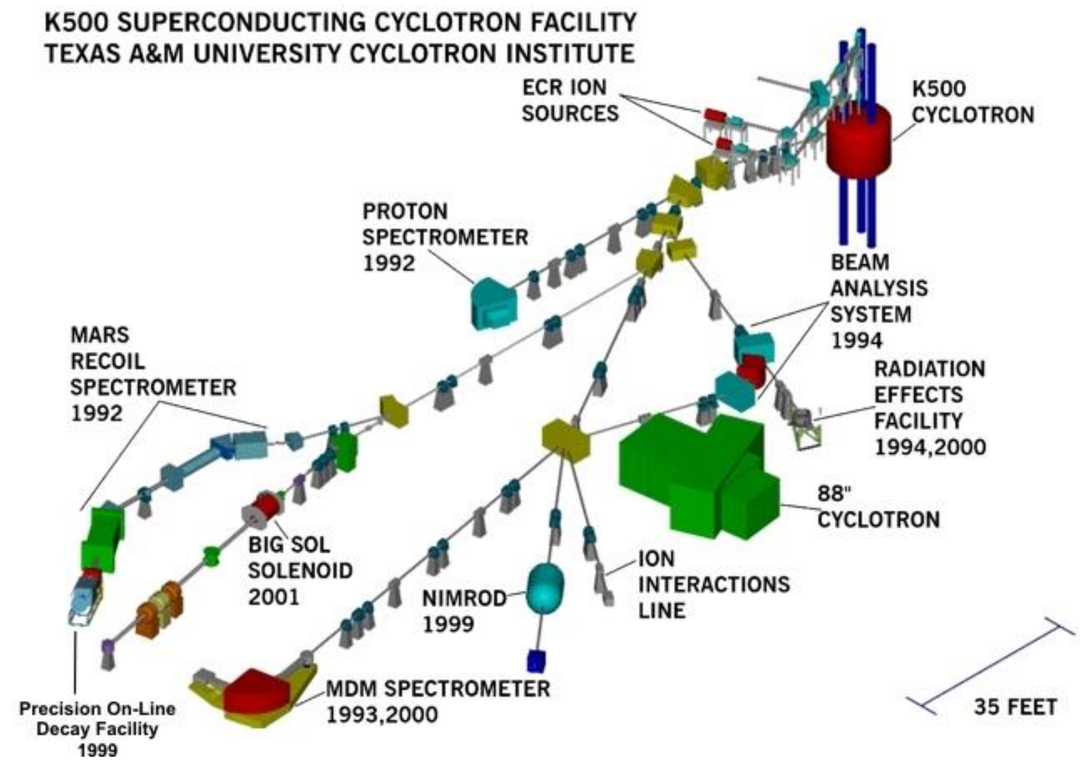
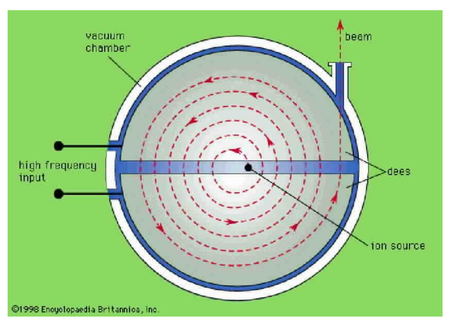
Cyclotron Institute

Texas A&M University

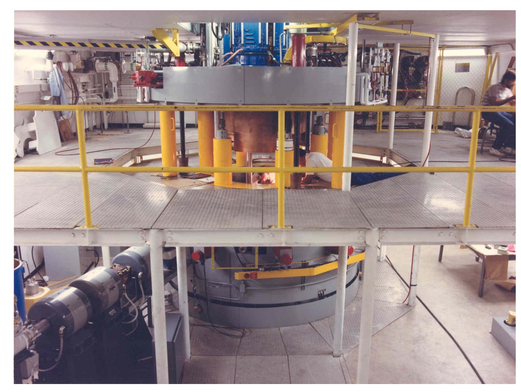
The Cyclotron Institute houses two particle accelerators and provides the primary infrastructure supporting the Texas A&M University programs in nuclear chemistry and nuclear physics. Support is provided by Texas A&M University, the state of Texas, the Department of Energy, the National Science Foundation and the Robert A. Welch Foundation. The programs at the Cyclotron Institute include: education, basic research and applied applications.



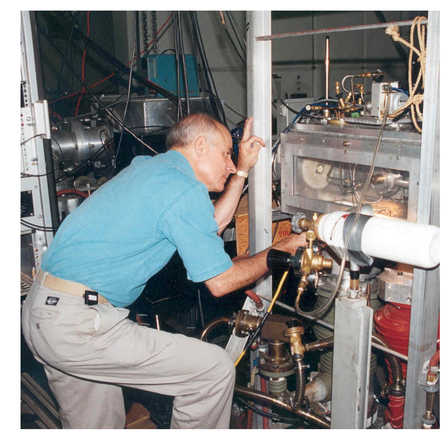
The K150 Cyclotron

Built at the Cyclotron Institute and commissioned in 1967 as a new and improved version of the 88" at the University of California, Berkeley, shown above. The K150 has one electric field region that separates two regions, called D's, see diagram above. An ion does not "feel" the electric field in the D's and continues in a circular path. When the ion enters the electric field region the ion accelerates across the gap. If the electric field does not switch before the ion once again transverses the gap, the ion will be decelerated. So the electric field must oscillate in tune with the period of the ion to continue the acceleration process.



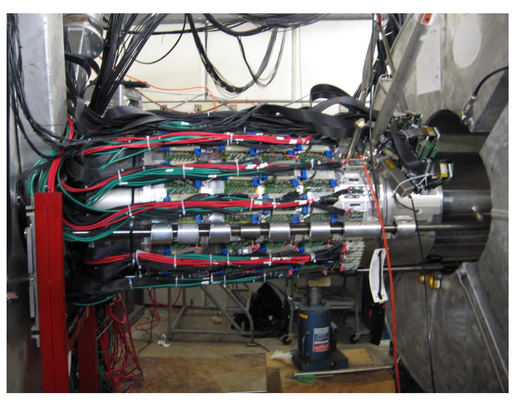
The K500 Superconducting Cyclotron

25 miles of niobium-titanium coils surrounded by 100 tons of steel and cooled with liquid helium to 4.5K (-451°F) make superconducting magnets with a maximum field of 5 Tesla (100,000 times Earths magnetic field) to contain the ions. Then three electric field regions oscillating at 8 to 30 million times a second accelerate the ions up to 40% the speed of light (about 75,000 miles per second).



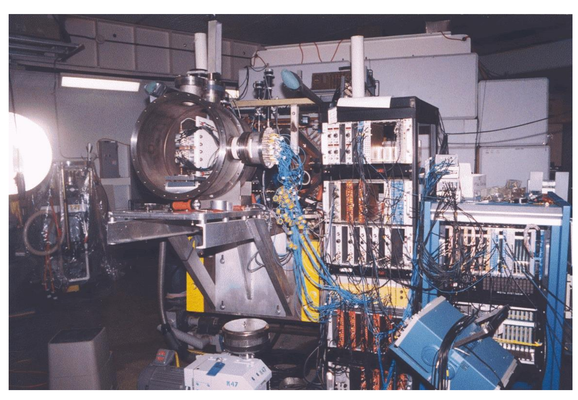
The Highly Charged Ion Interaction Line

This line studies ion interactions with matter, such as inner shell electron ionizations and changes in ion charge state distributions.



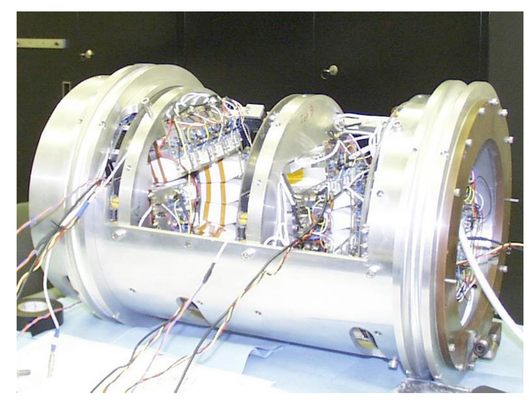
The Neutron and Ion Multidetector for Reaction Oriented Dynamics - Indiana Silicon Sphere

NIMROD-ISiS is a 4π array that detects fragments from violent collisions. 228 detector modules detect charged particles and a surrounding 3800L tank of scintillator liquid detect neutrons.



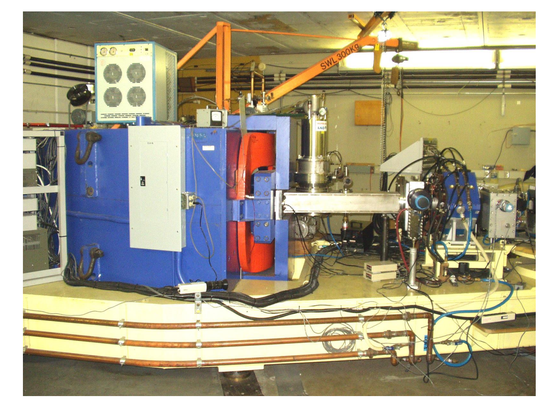
The Momentum Achromat Recoil Spectrometer

The MARS line can separate reaction products into isotopically pure beams for further study at the rear of the line, providing access to rare ion beams (RIBs).



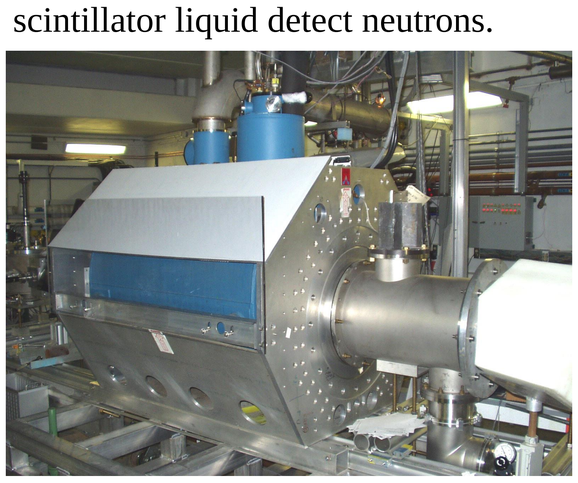
The Forward Array Using Silicon Technology

FAUST is a forward array composed of 68 detector telescopes used for studying peripheral reactions. FAUST is mobile and can attach to MARS or the Solenoid to study reactions using RIBs.



The Multipole Dipole Multipole Mass Spectrometer

The MDM line detects fragments with high resolution measuring the position, angle, energy loss, energy and time of flight of the fragments using a detector on the focal plane.

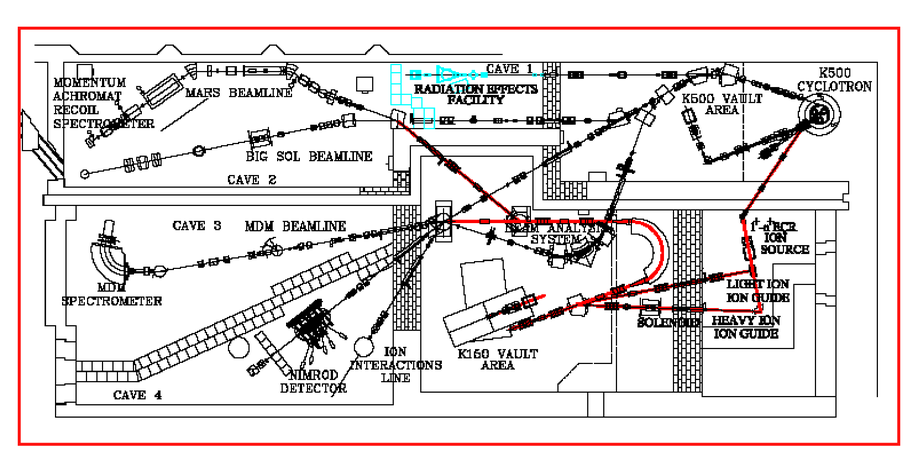


The Superconducting Solenoid

The BigSol Solenoid received from Michigan State University has a 7 Tesla field used to select specific isotopes allowing access to RIBs.

The Single Event Effects Facility

The SEE line is used by outside users such as NASA, HP, and JPL to test effects of radiation on materials, such as computer chips.



The Cyclotron Institute is currently undergoing a facility upgrade. The K150 Cyclotron has been reactivated to deliver high intensity light particle and heavy ion beams, to be used for production of rare isotopes for acceleration in the K500 Cyclotron and as precursor beams to produce significantly higher intensity stripping and fragmentation beams in the MARS spectrometer. In addition to greatly extending the reach of the present TAMU research program, this facility could play a much wider role in support of the national accelerator based scientific research effort.

For more information visit our website at: http://cyclotron.tamu.edu