NSCL is a center for world-class rare isotope research and education. Scientists here are dedicated to studying the nature of the nucleus and the rules that govern its behavior. Each new discovery helps shed light on how nuclei have shaped our universe and ourselves.

The nuclear physics graduate program at MSU is consistently ranked one of the best in the country

The proposed next step for NSCL – the Isotope Science Facility – will allow experimenters to study previously unattainable nuclei. ISF-produced beams will allow researchers and students to answer questions at the frontier of nuclear science. The facility will also yield a host of cross-disciplinary benefits in fields as diverse as biomedicine, materials science, national and international security, and nuclear energy.

The scientists who will take advantage of the ISF's capability are being trained today at NSCL, which awards 10 percent of U.S. nuclear science Ph.D.s. The nuclear physics graduate program at MSU is consistently ranked one of the best in the country. NSCL is committed to attracting, teaching and mentoring the next generation of scientists – work that will continue far into the future with the construction of the ISF.

Operation of NSCL as a national user facility is supported by the Experimental Nuclear Physics Program of the U.S. National Science Foundation.

Each year several thousand people visit NSCL, which offers tours, camps and research programs for students of all ages.

For more information on these programs or to schedule a free 90-minute tour,

call: **(517) 355-9671**
write to: **visits@nscl.msu.edu**
go to: **www.nscl.msu.edu**

NSCL is located on the Michigan State University campus near the intersection of Shaw Lane and Bogue Street.

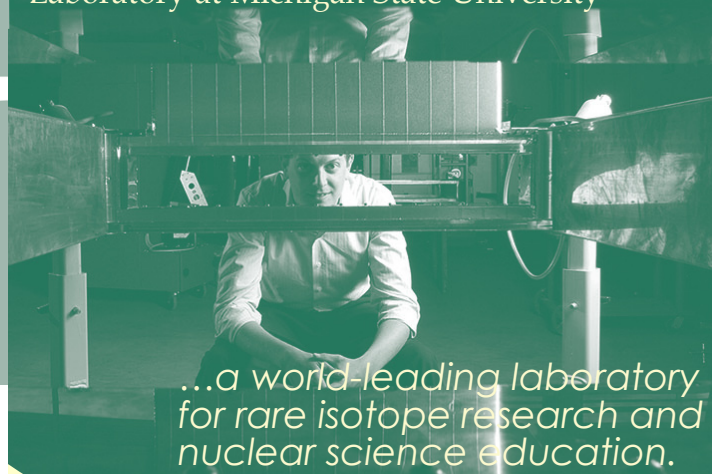
Visitor parking is available in the lot to the east of the laboratory, while the ramp to the north can be used as overflow.

MICHIGAN STATE UNIVERSITY

National Superconducting Cyclotron Laboratory
Michigan State University
1 Cyclotron, East Lansing, Michigan 48824-1321
Phone 517-355-9671
www.nscl.msu.edu

NSCL
Welcome

National Superconducting Cyclotron Laboratory at Michigan State University



…a world-leading laboratory for rare isotope research and nuclear science education.

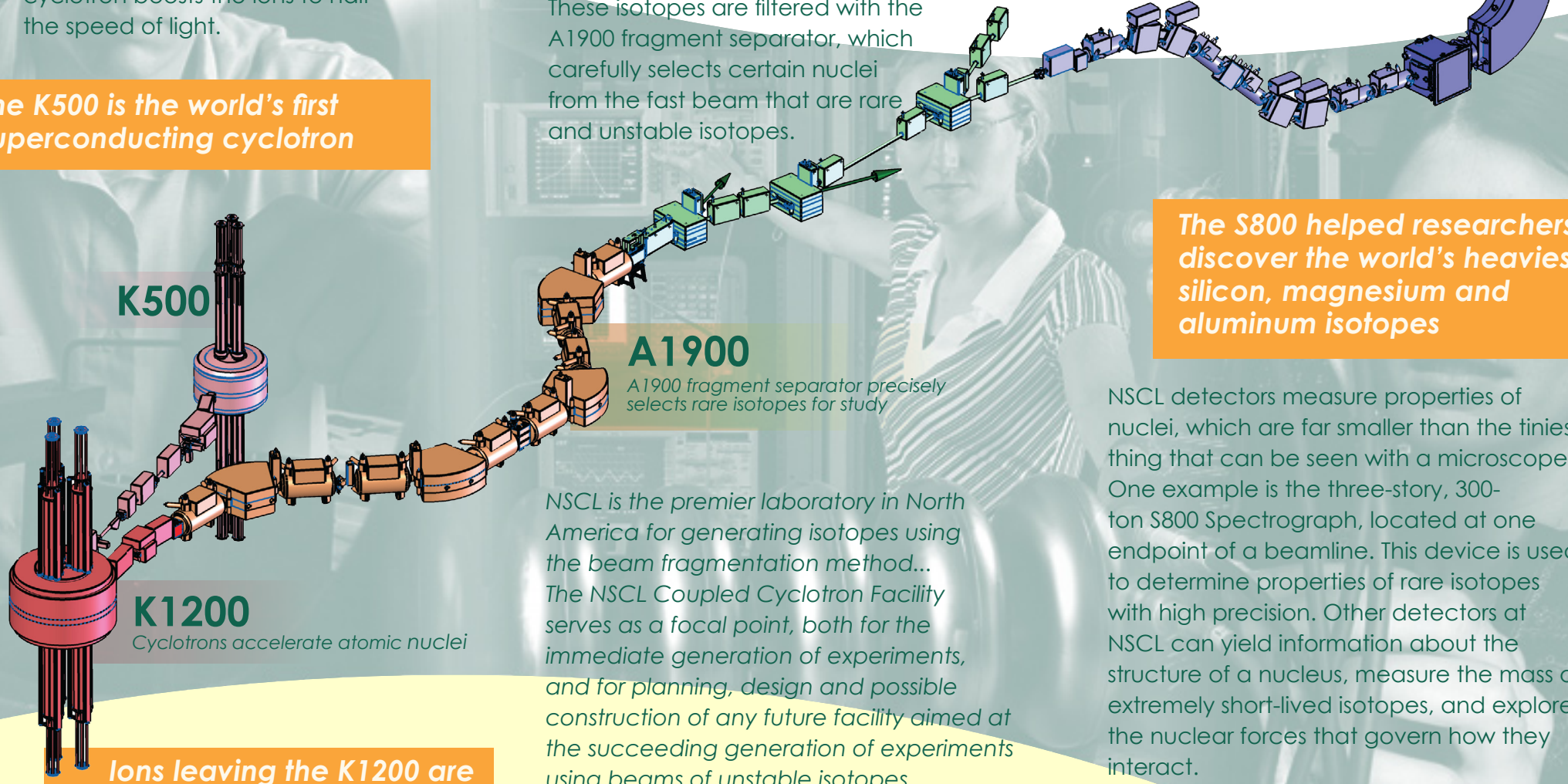
The Coupled Cyclotron Facility at NSCL

Ion sources feed partially-ionized atoms to the K500 cyclotron, which accelerates the ions up to 30,000 miles per second or 15 percent of the speed of light. The larger and more powerful K1200 cyclotron boosts the ions to half the speed of light.

The K500 is the world's first superconducting cyclotron

The A1900 can select one nucleus from a million billion others

The fast beam of ions then collides with a target, creating a wide variety of secondary isotopes. These isotopes are filtered with the A1900 fragment separator, which carefully selects certain nuclei from the fast beam that are rare and unstable isotopes.



S800

Downstream detectors measure reaction products made when a beam of rare isotopes strikes a target

The S800 helped researchers discover the world's heaviest silicon, magnesium and aluminum isotopes

K500

A1900

A1900 fragment separator precisely selects rare isotopes for study

K1200

Cyclotrons accelerate atomic nuclei

Ions leaving the K1200 are fast enough to circle the Earth four times every second

NSCL is the premier laboratory in North America for generating isotopes using the beam fragmentation method... The NSCL Coupled Cyclotron Facility serves as a focal point, both for the immediate generation of experiments, and for planning, design and possible construction of any future facility aimed at the succeeding generation of experiments using beams of unstable isotopes.

- Arden L. Bement, Jr.
Director of the National Science Foundation

NSCL detectors measure properties of nuclei, which are far smaller than the tiniest thing that can be seen with a microscope. One example is the three-story, 300-ton S800 Spectrograph, located at one endpoint of a beamline. This device is used to determine properties of rare isotopes with high precision. Other detectors at NSCL can yield information about the structure of a nucleus, measure the mass of extremely short-lived isotopes, and explore the nuclear forces that govern how they interact.