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WITH VIDEO

# MSU: Cutting-edge accelerator project lures top minds, creates jobs

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**CORRECTION:** An earlier version of this story incorrectly stated the amount the Department of Energy was including in its 2011-12 budget request for preliminary design plans. This version is correct.

EAST LANSING -- It will be two years before ground is broken on the \$600-million Facility for Rare Isotope Beams at Michigan State University. But already this haven for nuclear physics research, projected to inject \$1 billion of economic activity into the state, is having an impact.



Ralph Witgen, an engineer, inspects a magnet for the existing cyclotron laboratory at Michigan State University. MSU is getting a new Facility for Rare Isotope Beams that will be to the cyclotron what modern-day vehicles are to the Model T. (WILLIAM ARCHIE/DETROIT FREE PRESS)

MSU Facility for Rare Isotope Beams, by the numbers

1,000	75
371	10%
165	\$1 billion
400	\$387 million

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Some of the top minds in science have been recruited to MSU. Students in the nuclear physics graduate program are energized. And that program? It's now tops in the nation.

All this despite a lengthy construction timetable that won't have the facility running until 2020.

When it's done, it will house the world's most powerful heavy-ion accelerator, which will be 1,000 times more powerful than existing accelerators at MSU and capable of creating intense beams of rare isotopes. The implications are enormous, and the project is expected to lead to cutting-

edge research in nuclear physics and medicine.

MSU already has gained international prominence with its cyclotron lab. But the new facility isn't just more powerful -- it is to the cyclotron what modern-day vehicles are to the Model T.

"When FRIB is done we'll discover stuff we can't even imagine now," said Thomas Glasmacher, project manager.

Top scientists flock to MSU as accelerator project ramps up

It took the better part of a year for John Weisend to decide to uproot his family and leave his job at the SLAC National Accelerator Laboratory in California and move to Michigan. But in the end, he decided it was worth it to be part of the launch of one of the world's most powerful research machines.

The Facility for Rare Isotope Beams (FRIB) "will in fact be the world-class place to do heavy-ion physics. And it's very exciting to be part of making that possible," said Weisend, cryogenics group leader at the FRIB and an engineering professor at MSU since April.

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**MSU's Facility for Rare Isotope Beams**  
 Construction on Michigan State's Facility for Rare Isotope Beams, or FRIB, is expected to be completed by at least 2020. Here are some facts about Michigan State's nuclear physics program and the FRIB.

**Top 5 nuclear physics programs**  
 U.S. News & World Report in 2010 ranked Michigan State University's nuclear physics graduate programs tops in the country, based on how academics in the sciences rated the programs. In previous years the program had been ranked second.

1. Michigan State University
2. Massachusetts Institute of Technology
3. University of Washington
4. State University of New York, Stony Brook
5. (tie) Indiana University, Bloomington; Yale University

**How the isotopes are made**

- The FRIB will have a linear accelerator that will shoot an intense beam of atoms in a straight line through a tunnel 40 feet underground.
- The tunnel is a couple of inches in diameter and about 1,600 feet long. Electromagnetic forces will accelerate the beam up to about half the speed of light, and focus the beam of particles toward its target of nuclei. When the atoms smash together, they break apart, forming new and different isotopes.
- Many of the isotopes will last only a split second. But some will last longer. Researchers will be able to study and conduct experiments using them, even those that last seconds.

An isotope is a substance made of atoms with a different number of neutrons than is typical.

Source: Michigan State University  
 MARTHA THERRY/Detroit Free Press

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