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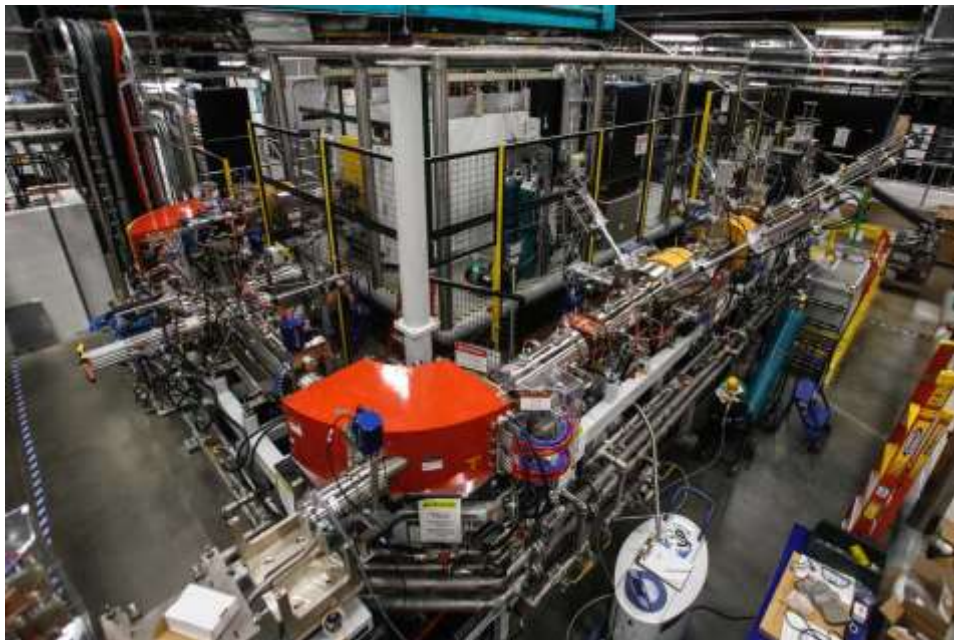
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What can you do with a \$765M nuclear research facility? Fight art forgery, for one thing

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One of two beamlines being built at the Facility for Rare Isotope Beams, or FRIB, Wednesday. Beamlines help arrange beams for further acceleration and make changes in the time structure to ramp up a beam's intensity.

MATTHEW DAE SMITH/Lansing State Journal

EAST LANSING - It would be a signature that's virtually impossible to fake.

Because you'd need an immensely powerful nuclear science research facility to create it.

A pair of Michigan State University researchers — Wolfgang Bauer and Bradley Sherill — have proposed using equipment at the university's \$765 million Facility for Rare Isotope Beams to embed isotopes below the surface of valuable works of art.

Doing so in a specific pattern and density would allow for a unique signature an owner or gallery could check with a handheld isotope detector. And because these isotopes would decay at a predictable rate, the signatures could be useful for a century or longer, explained Bauer, a theoretical physicist.

The hefty prices for paintings by the likes of Jackson Pollock and Pablo Picasso drive a lucrative forgery market.

German forger Wolfgang Beltracchi, for instance, admitted in 2011 to faking more than a dozen works of art that sold for \$45 million. Beltracchi later told the German magazine *Der Spiegel* that he had faked works of approximately 50 artists during his career as a forger.

It wouldn't cost the owner of an artwork much to embed isotopes into their piece at FRIB, Bauer said, a few hundred dollars to rent time at the facility and to use the necessary electricity, "but this relatively low price is only possible because FRIB already exists."

The prohibitively high cost of similar equipment would mean a forger like Beltracchi couldn't replicate the isotope signature, Bauer said.

"A potentially interested forger would have to spend hundreds of millions of dollars to imprint the same signature into the art piece," he said.

FRIB is funded primarily by the U.S. Department of Energy. Once completed, it will be capable of producing extremely rare, short-lived isotopes - atoms that are chemically similar to the elements on the periodic table, but have a different number of neutrons - contributing to scientific understanding of the universe and its fundamental forces.

The idea came out of discussions back when MSU landed FRIB in 2008. Bauer and Sherill, director of the National Superconducting Cyclotron Laboratory, sought to patent the process in 2016. The application is under review.

More: FRIB-powered MSU, Lansing becoming Silicon Valley of particle acceleration



MSU students Trenton Lively and Monica Fineis toss beanbags near The Rock on the MSU campus, Oct. 16, 2008, at the "Frib Frenzy Day " in support of MSU's bid to be the site for the Facility for Rare Isotope Beams (FRIB). The two are both on the MSU FRIB student advisory committee.

Lansing State Journal file photo

“The thought process was, 'how can we make societally useful applications of the FRIB accelerator?’” Bauer said.

Art galleries and private owners seek to authenticate their works in myriad ways, according to John Steele, vice president of exhibition, collection and information strategies at the Detroit Institute of Arts

“Authentication is a tricky business,” Steele said. “It’s really about looking at the big picture and seeing what’s available, assess a piece of art and give the best insight into what’s happening.”

Dozens upon dozens of pieces are evaluated by the conservation department at the DIA every year, Steele said. A museum curator will look to the past, researching ownership and connecting documentation to help better understand a piece in question.

Conservators look at the condition of the piece itself, analyzing the elemental composition to determine what pigments were used and when they were prominently used by artists. Other imaging techniques that use infrared or ultraviolet light can also be used to help draw conclusions.

“We at DIA are fairly well equipped for an art museum,” Steele said, adding that they do occasionally offer their expertise to smaller museums out of professional courtesy.

Conservators rarely speak in absolutes, Steele said, opting instead to learn as much as they can to make measured conclusions.

Steele said something like what’s being discussed at MSU could add another tool to the already extensive utility utilized by galleries and private collectors.

Civil construction at FRIB has already wrapped up, and researchers are in the midst of installing and testing technical components ahead of its expected completion in 2021.

More: Michigan State plans \$35 million in additional technology, new building for FRIB

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