

# A year after the deal, nuclear collaborations languish

By **Richard Stone**

In Iran, the nuclear agreement signed last year with world powers isn't popular. Economic payoffs have been slow to materialize, and resentment over years of isolation and sanctions remains strong. Ali Akbar Salehi, president of the Atomic Energy Organization of Iran (AEOI) in Tehran, believes that getting Iranian and foreign scientists to work together is a potential salve. It "will recover lost trust and build up confidence," he says. Joint projects could also make up for the loss of opportunities for Iranian nuclear scientists under the deal, says Salehi, who says he has upward of 15,000 nuclear scientists and engineers to worry about. "I have to be mindful of them. I shouldn't let them feel, 'Look, everything is slowing down,' or 'We are running out of jobs.'"

But except for projects in fusion (see main story, p. 1083), scientific cooperation is lagging. One initiative that is slow off the mark is the transformation of the underground Fordow Fuel Enrichment Plant, which housed about 2700 centrifuges for enriching uranium, into an international physics center. Under the nuclear agreement—officially known as the Joint Comprehensive Plan of Action (JCPOA)—Russia is helping Iran reconfigure 358 of the centrifuges at Fordow to produce stable isotopes for medicine and industry.

"The modification of the design is not an easy job," says Salehi, who predicts it could take another year to complete the work. One challenge: Iran has not settled on which radioisotopes to produce. "We want to produce isotopes that are needed on the market," Salehi says. "It's not research for the sake of research."

In the meantime, Iran has proposed turning a second wing at Fordow—emptied of its centrifuges—into a nuclear research lab that, Salehi says, would "replicate and be complementary" to an International Atomic Energy Agency lab in Seibersdorf, Austria. He would like Iranian and foreign experts "to come up with different proposals and see what we can do there."

Another JCPOA task intended to bring together nuclear scientists is re-engineering the Arak heavy water reactor, originally designed to burn natural uranium, which could generate about a bomb's worth of plutonium a year. Iran agreed to switch to low-enriched uranium—which yields only traces of plutonium when burned—and use a smaller calandria, the vessel holding the reactor core, which would make it harder to switch back to natural uranium fuel. In

January, workers removed the existing calandria and filled it with concrete. "There were people here [at AEOI] in mourning over that," AEOI Vice President Behrooz Kamalvandi says.

China and the United States are co-chairing a working group that will review Iran's new reactor design. The goal is to ensure, as a U.S. Department of Energy official put it, that the reactor "will allow effective peaceful uses but not rapid accumulation of plutonium suitable for weapons." But Salehi complains that the group is moving slowly. "The working group is not doing what it is expected to do," he says. "We need our design to be certified by more advanced countries. ... But if they don't, so be it. We will go on with our work."

European labs are one bright spot for Iranian researchers, says Javad Rahighi, director of the Iranian Light Source Facility (ILSF) in Tehran, which aims to build an advanced synchrotron. He is about to ink a deal to buy 500 hours of beam time in 2017 at the ALBA synchrotron near Barcelona, Spain. Next year ILSF will also start building a beamline at ELETTRA, a synchrotron in Trieste, Italy.

The JCPOA has melted other barriers between Europe and

Iran. In April in Tehran, a senior EU delegation that included Carlos Moedas, European commissioner for research, innovation and science, agreed to welcome Iranian involvement in research on food security, climate change, and rare diseases, and to step up Iranian engagement in Horizon 2020, the European Union's flagship research program. The European Union also invited Iranian nuclear scientists to submit proposals to the Euratom research program in areas such as nuclear medicine and reactor safety.

Iran's scientific community isn't getting much

help from the United States, however. Current U.S. law limits cooperation on nuclear research, and U.S. Department of the Treasury regulations bar spending money in Iran for most purposes, including research, without a license. Last month, the treasury department rejected an application from Biruni Inc., a foundation in Los Angeles, California, for a license to transfer funds to help pay for construction of Iran's national astronomical observatory near Kashan.

Many Iranian scientists are disappointed that the U.S. scientific community remains on the sidelines. "Americans sitting back and doing nothing for us is not a pleasant thing to see," Rahighi says. "We took very bold steps," Kamalvandi adds. "The nuclear deal is still alive, but it needs a lot of work and a lot of help in order to succeed." ■



European labs are aiding Javad Rahighi's quest to build an advanced synchrotron in Tehran. Rahighi is disappointed that U.S. collaborations have not materialized.

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Editor's Summary

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