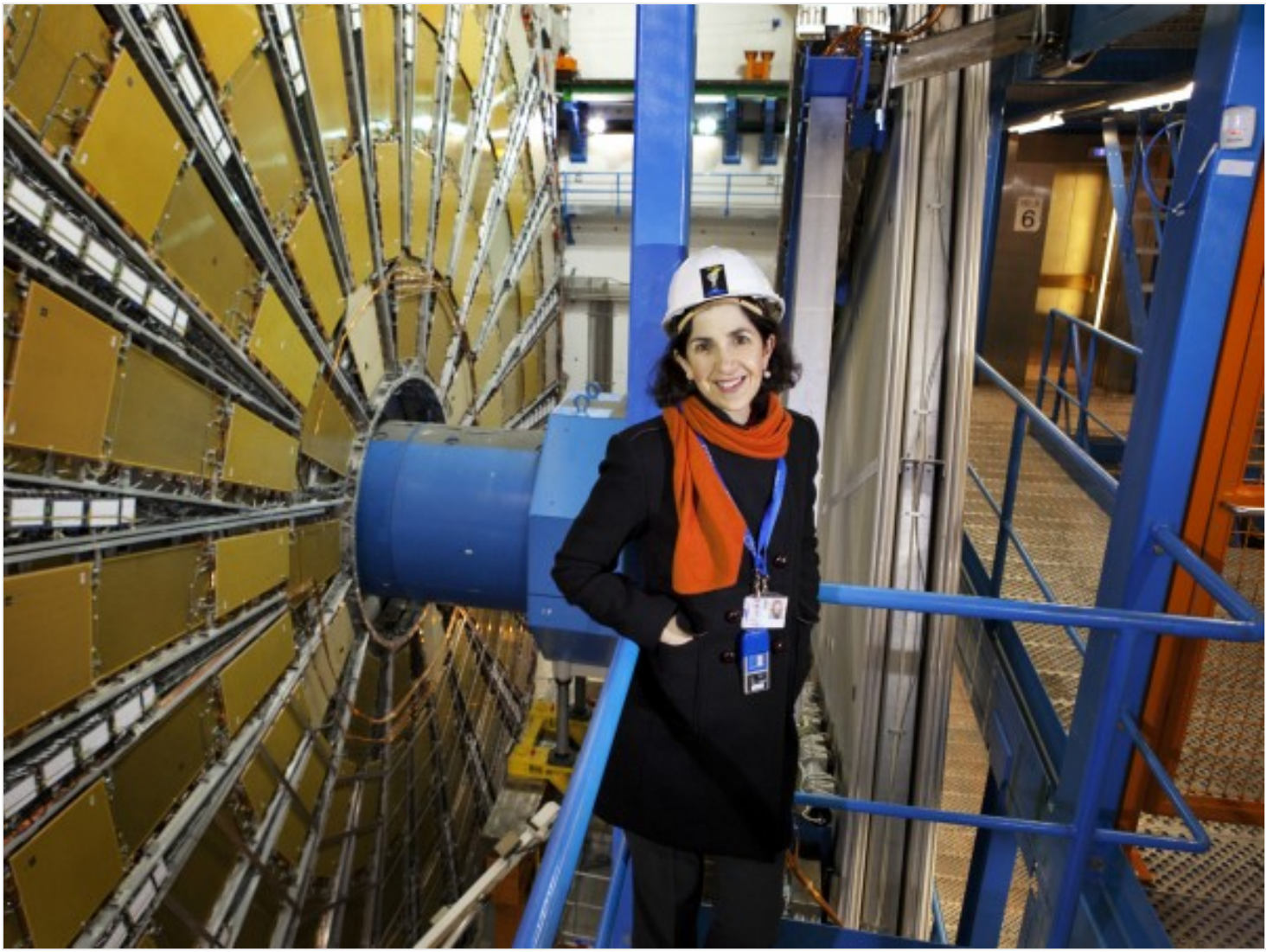
Italian physicist to lead world's leading particle physics lab



Fabiola Gianotti, an Italian physicist who garnered global attention 2 years ago when she and another physicist announced the discovery of the Higgs boson, has been named the next director-general of CERN, the European particle physics laboratory near Geneva, Switzerland, where that momentous discovery was made. Gianotti will take over for current director-general Rolf-Dieter Heuer on 1 January 2016, the laboratory announced today.

CERN boasts the world's biggest atom smasher, the 27-kilometer-long Large Hadron Collider (LHC), and an annual budget equal to $1.1 billion, making it the de facto global center of particle physics. Gianotti will be the 16th director-general in the laboratory's 60-year history. She will also be the first woman, which has some leading female particle physicists cheering.

"I just sent her a note saying it was the best news I'd ever heard," says Melissa Franklin of Harvard University. "It makes me proud to be a physicist." Gianotti's appointment "is really

going to change the feel of CERN for some people," Franklin predicts. Young-Kee Kim, of the University of Chicago in Illinois, says Gianotti's appointment is "huge." "Scientifically, intellectually, and even politically, this is a powerful position," she says. "This is a fantastic thing."

A staff member at CERN since 1994, Gianotti, 52, has been in the spotlight before. From March 2009 to February 2013 she served as spokeswoman for the 3000 researchers working with ATLAS, one of four gargantuan particle detectors fed by the LHC. In that elected position, she participated in the biggest event in particle physics in decades. On 4 July 2012, she and the representative for the rival detector, CMS, reported at CERN that the two teams had independently discovered the long-sought Higgs boson. That year, *Time* magazine named Gianotti a runner-up in its annual "Person of the Year" issue.

Gianotti's peers say she's a first-rank physicist and leader. "Her style is to be incredibly well prepared for everything," says Franklin, who is a member of the ATLAS team. "And she does it in a very firm but gentle way." Kim, who also works on ATLAS, notes that Gianotti was involved in the design of the detector from the beginning. "She's very hands-on," Kim says.

Gianotti has also served on an advisory panel that recently laid out a new road map for particle physics in the United States, Kim notes. So she has a deep understanding of the global enterprise, which should serve her well in charting the lab's future, says Kim, who served as deputy director of the U.S. Fermi National Accelerator Laboratory in Batavia, Illinois, from 2006 to 2013.

One obvious issue that Gianotti will face will be a planned upgrade to the LHC and its detectors around 2022 to 2024, Kim says. That may sound like a long way away, but given the size and complexity of the task, CERN researchers are planning for that project now, she says. Gianotti may also have to lead the lab through the decision on what to do after the $5.5 billion LHC stops running in 2030, Franklin says. That will depend on what, if anything, beside the Higgs boson the LHC produces, she says. Again, given the size and expense of the next great collider, physicists may have to start planning for it relatively soon, Franklin says.

In fact, Gianotti seems likely to lead CERN through the most critical period not only in the lab's history, but also in the history of particle physics. The Higgs boson is the key to physicists' explanation of how all other fundamental particles get their mass. And it provided the last piece to physicists' standard model, a mathematical theory of the known particles that is completely self-contained and self-consistent, but which leaves many big questions unanswered—such as,

what is the mysterious dark matter whose gravity appears to bind the galaxies?

Physicists are hopeful that the LHC—which has been down for repairs since February 2013 and won't start up again until next spring—will blast out some new, unexpected particle that will point them to a deeper understanding of matter and the universe. But if it doesn't, then the discovery of the Higgs could mark not a new beginning, but rather the end of the road for accelerator-based particle physics.

It all depends on what nature has in store. Which is something that neither Gianotti nor any other physicist can control.