

Jupiter mission selection garners excitement, questions

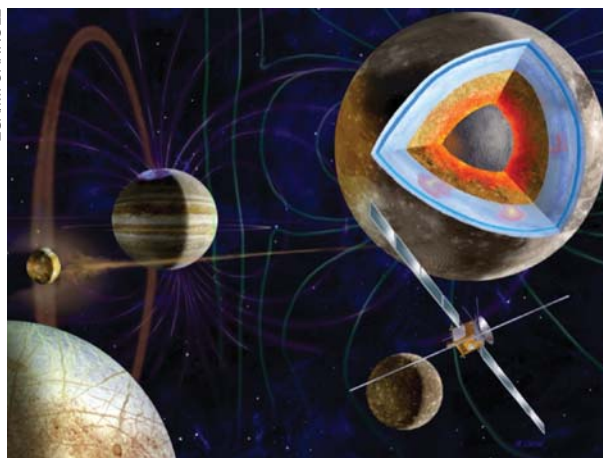
A trip to Jupiter and its moons will be Europe's next large science mission, the European Space Agency (ESA) announced on 2 May. The *Jupiter Icy Moons Explorer (JUICE)* beat out proposals for an x-ray mission and a gravitational wave observatory.

Since spring 2011, all three missions were scaled back to go solo instead of as joint missions with NASA, once it became clear that NASA couldn't come up with the money to participate on ESA's timeline (see *PHYSICS TODAY*, May 2011, page 23, and June 2011, page 22). The mission teams were given less than a year to trim their plans to €850 million (\$1.1 billion) and not rely on other space agencies. *JUICE* is scheduled for launch in 2022.

The original Jupiter mission had involved two craft, one by ESA to focus on Ganymede and one by NASA to probe Europa. In *JUICE*, only the Ganymede probe remains, but its trajectory was revised to include two flybys past Europa, and also to study Callisto. Athena Coustenis, a project science leader based at the Observatory of Paris-Meudon, says *JUICE* "is going to look at the whole system—the planet, the magnetosphere and its interactions with the moons and with the solar wind, and the moons. It addresses fundamental questions about how planets are formed, their atmospheres and surfaces, the emergence of habitable worlds." The planetary science community, she adds, "has been waiting for such a large mission for a long time."

Downsizing the x-ray and gravitational-wave observatories was more complicated. The *Advanced Telescope for High-Energy Astrophysics*, or *ATHENA*, would have fewer instruments with less angular resolution than originally envisioned. Even so, says project working-group chair Xavier Barcons of the Institute of Physics of Cantabria in Spain, *ATHENA* "managed to retain most of the science objectives." And the *New Gravitational-wave Observatory* (NGO) would have two, rather than three, interferometric arms, and they would be shorter than originally planned. "It's still grand science," says Karsten Danzmann of the Max Planck Institute for Gravitational

ESAM. CARROLL



The *Jupiter Icy Moons Explorer* will probe the surfaces, atmospheres, and interiors of Jupiter and three of its moons.

Physics. "The only thing we really lose is the very high redshift universe."

Not surprisingly, the losing teams and their supporters are disappointed. Based on what he heard from "trustworthy sources," Cardiff University astronomer B. S. Sathyaprakash, who is not involved in any of the missions but whose scientific focus aligns most closely with the NGO, wrote a widely circulated letter to Alvaro Giménez, ESA director of science and robotic exploration. Sathyaprakash asked whether it's true that ESA's Space Science Advisory Committee (SSAC) gave the NGO the highest scientific rank, why the cost estimate for the NGO was suddenly raised before the selection meeting, and other questions. He is not questioning the merit of any of the projects, he says. "I am asking about the process." As of press time, he had no answers from ESA. In addition, some 1500 people have signed a letter supporting *ATHENA*. Their concern is that astrophysics will be left without an x-ray observatory in the 2020s.

Referring to the choice of *JUICE*, one NGO scientist says, "There was a time when space was about visions, going to where no one has gone before, let us get a man on the Moon before the end of the decade, that stuff. Now it seems to be more about risk avoidance."

Any mission that gets to this stage of competition "should be expected to be very good," notes Fabio Favata, who heads ESA's science planning office. "And any discussion in the SSAC belongs to the committee. The important thing is their recommendation." The SSAC recommendation for *JUICE* was unanimously accepted by the Science Programme Committee, which consists of representatives from ESA member states.

Both *ATHENA* and the NGO will have a chance to compete again, with a foreseen launch date in 2028. Says

Danzmann, "This timing will give NASA time to reassemble and contribute."

Toni Feder

Max Planck pushes frontiers around globe

Germany's prestigious Max Planck Society (MPG) is working to increase its international presence through the formation of virtual centers around the world. The latest, formalized on 29 March, is the Max Planck Princeton Research Center for Plasma Physics, with Princeton University, the Princeton Plasma Physics Laboratory (PPPL), and three Max Planck institutes as partners.

The new center will focus on fusion plasma physics and plasma astrophysics.



ELEANOR STARKMAN

Princeton University president Shirley Tilghman and Max Planck Society president Peter Gruss at the 29 March signing ceremony that launched the Max Planck Princeton Research Center for Plasma Physics. Among those attending the ceremony were (back row, from left) James Stone, Princeton University professor of astrophysical sciences; A. J. Stewart Smith, Princeton University dean for research; and Busso von Alvensleben, consul general of Germany in New York.

The main topics of collaborative research will be magnetic reconnection, plasma turbulence, energetic particles in plasmas, and rotating plasmas. "In each of the four topics," says PPPL director Stewart Prager, "there are major physics conundrums. We are in the process of planning which questions will be the most fruitful to attack."

In addition to the plasma physics center, a collaboration with researchers in Vancouver, British Columbia, Canada, focuses on quantum materials, and two centers in Pohang, South Korea, address the areas of attosecond science and complex materials. Among the centers outside of physics either under way or planned are those in computer science (India), lipid research (India), systems chemical biology (Japan), anthropology and archaeology (Israel), and instabilities in market societies (France). After a fast ramping up that began in 2010, the plan is to create a maximum of two new centers a year, says Berthold Neizert, MPG head of research policy and international relations.

Funding for each center is \$600 000–\$1 million a year for five years, split evenly between the MPG and its partners. The money mostly funds post-docs, workshops and schools, and visits to partner institutions. The centers provide an opportunity for young people "to learn about an international facility without losing their home affiliation," Neizert says.

The MPG has some 82 brick-and-mortar research institutes, including a handful outside of Germany. "Science is international, and it's teamwork," says Neizert. "We think this model [of virtual centers] has the potential to increase the attractiveness of both partners. We want to increase the international visibility for students and post-docs—so more come to Max Planck institutes in Germany and vice versa."

Virtual centers, Prager says, "can be a huge home run. You can get to places you never would have gotten to. Or they can be duds. It all depends on having a core of dedicated people who want to seize the opportunity and run with it."

Toni Feder

news notes

Antarctic telescope. China's Kunlun station on Dome Argus, the highest point of the Antarctic Plateau, now has its first telescope. The 50-cm robotic, steerable AST3-1, which will be used to study variable objects, was installed in February.

FUJIA DU, NIAOT



Observations from China's Kunlun station in Antarctica are getting started with the first in a trio of telescopes.

Two other telescopes to complete an AST3 trio are set to be installed in January 2014. With three, "we will be able to intensively survey a large area of the sky," says project leader Lifan Wang, director of the Chinese Center for Antarctic Astronomy in Nanjing and an astronomy professor at Texas A&M University. For example, he says, the telescopes will be used to search for exoplanets and, in three different wavelengths "for early supernova discovery and follow-up."

The telescopes are being built in Nanjing at a cost of a couple million dollars each. Wang points to the power supply for the telescope and cameras built by partners at Australia's Univer-

sity of New South Wales as one key to the project's success. "It has to run year-round in that environment, providing power, heat, and internet connectivity, with no human on site. It's very impressive technology."

Plans for Kunlun station also include a 2.5-m optical/IR telescope and a 5-m submillimeter dish (see PHYSICS TODAY, January 2011, page 22). **TF**

Physics faculty jobs. Faculty numbers are up in US physics departments. In 2010 there were a total of 9400 full-time-equivalent faculty members in 758 physics departments, up from 8200 FTEs in 766 departments a decade earlier.

Departments where the highest degree offered was a bachelor's degree had an average of 5.9 faculty members; where the highest physics degree was a master's, it was 13.3; and in PhD-granting departments, it was 29.2. All of those numbers are higher than 10 years earlier.

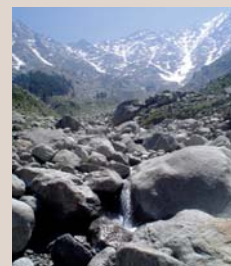
Overall, nearly one-fifth of physics faculty were in temporary or non-tenure-track positions in 2010. Such nonpermanent positions are the easiest to add or cut, so they provide a useful flexibility in a tight economy.

Those and related data are based on a 2010 survey by the Statistical Research Center of the American Institute of Physics. The report, *Number of Physics Faculty Members*, is available at <http://www.aip.org/statistics/trends/reports/awf10physfaculty.pdf>. **TF ■**

Recently on
**physics
today**
online...

► Points of View

Jed Brody of Emory University shares his conviction that scientific and religious views of the world are complementary and compatible.



► Down to Earth

Rachel Berkowitz reports on research presented at the recent meeting of the European Geosciences Union, including a study that examined the potential effects of offshore wind farms on ecosystems.



◀ The Dayside

In his blog, PHYSICS TODAY's online editor Charles Day writes about visionary physicists, the need for editors to be vigilant, Edward Condon's reflections on the history of quantum mechanics, and science in women's magazines.

www.physicstoday.org