UV observations and, with its high orbit, it will allow long observations of faint objects."

Global participation

Russia will cover the largest chunk of the *WSO*'s estimated €300 million ($400 million) tab, supplying the satellite bus, launch facilities, ground equipment, and a telescope with a 1.7-meter primary mirror. The rest will be provided in roughly equal parts by Russia's four main partners.

Germany has designed a high-resolution spectrograph, sensitive in the 103–310 nm range. Scientists in China are working on a long slit spectrograph (LSS) for observing extended and faint objects. Italy is developing an imaging camera with three channels that together cover the wavelength range from 115 nm in the UV through 700 nm in the visible. In addition, says Isabella Pagano of Italy's National Institute for Astrophysics, who is overseeing her country's participation in the *WSO*, "The Italian Space Agency is discussing using the Italian station in Kenya for this project. It would be nice because it's close to the equator and [with other ground stations] would give us control of the satellite 24 hours a day."

Spain—so far the only country besides Russia to have made a formal commitment to the project—is developing a space flight control and scientific operations center. Norbert Kappelmann of the University of Tübingen says the German team is waiting for the others to catch up with their R&D before applying for further *WSO* funding. China and Italy are both expected to sign interagency agreements with Russia later this year.

Many other countries have been involved in planning the *WSO*, and some may participate in smaller ways. "The UK financial situation is quite tight at the moment, so we are trying to participate in the LSS along with the Chinese," says Barstow. "But whatever happens in terms of hardware, we will participate as much as we can in the science program." Argentina, France, Israel, Mexico, the Netherlands, and others are similarly strapped for cash but intellectually engaged in the project. Ukraine and Kazakhstan are both involved, and South Africa hopes to host a science operations center.

Notably, the US is not on board. "The US scientific community told us it's not a high priority," says NASA press officer Grey Hautaluoma. US astronomers may fear that lobbying for an international project could jeopardize funding for a much larger UV telescope, which is currently stalled, or for the Cosmic Origins Spectrograph, a UV instrument slated to be installed on the *HST* next year. Moreover, some *WSO* scientists suggest it's better for the US not to be involved because US concerns about potentially sensitive information could cause delays.

In any case, the *WSO* will be open to the entire international astronomy community. "One of the things that is different about this compared to other Russian missions," says Barstow, "is that, after a lot of sweat and tears and negotiations, we have a scheme for how data will be handled that is much like what you might loosely call the western approach. There will be guaranteed time for the instrument people and a guest observer program for everyone else."

Dreams converge

"Before the Russian space agency approved the *WSO* about a year and a half ago," says Pagano, "it seemed like a dream." The project's genesis goes back to a plan from the late 1980s that languished after the Soviet Union collapsed, plus efforts begun in 1997 for a successor to the European Space Agency-NASA-UK *International Ultraviolet Explorer*. The convergence of the two was spearheaded by the late Willem Wamsteker, who was based at the European *IUE* station in Spain. That's why, says that country's *WSO* liaison, Ana Ines Gomez de Castro of the Universidad Complutense of Madrid, "Spain is so firmly committed to [the *WSO*]."

Meanwhile in Russia, says Shustov, "for more than 10 years, from the beginning of the 1990s, it was the dark ages for space science. If you compare the late 80s to the mid-90s, the official drop in funding was a factor of 20. That meant no real project could be realized." Beginning in 2004, he adds, "money rose. There is not as much money as [there was] in the Soviet Union, but now the federal space program looks more realistic."

Toni Feder

Germany forms alliance for terascale physics

Germany's high-energy particle physicists have formed a network to increase their international visibility and competitiveness as their field gears up for the start next year of the Large Hadron Collider (LHC) at CERN and, eventually, the International Linear Collider.

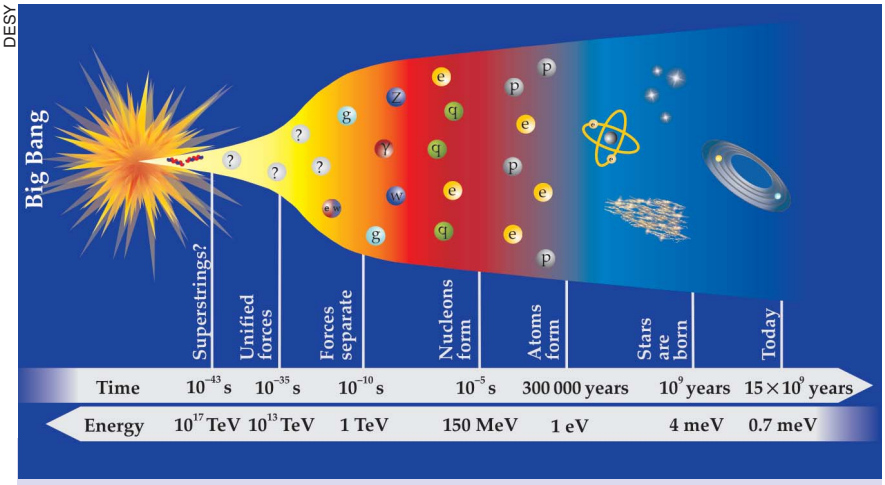
The terascale alliance, as it's known, gets started this month with €25 million ($33 million) over five years from the Helmholtz Association. The German government puts about €150 million annually into CERN. But, says the University of Wuppertal's Peter Mättig, who is co-coordinator of the alliance with the German Electron Synchrotron's (DESY's) Rolf-Dieter Heuer, "Universities get only €12 million per year of federal funds to exploit CERN. This disproportion is in some sense rectified through the alliance." The alliance will focus on the study of elementary particles, the forces acting between them, and related technological advances.

The alliance encompasses two Helmholtz centers—DESY and the Karlsruhe Research Center—plus the Max Planck Institute for Physics in Munich and 17 universities. "The overall goal is to combine the complementary aspects of what we have in Germany to shape one body," says Mättig. "The alliance is pretty huge," Heuer adds, "but I think it's very well focused on particle physics at the high-energy frontier." With the LHC, the energy frontier moves to the terascale, or 10^{12} eV (see the figure).

A large portion of the alliance money, roughly €15 million, will go toward 50–60 new jobs for researchers and technicians. "We want to create long-term positions for young people by offering tenure track," says Heuer. So far, universities and DESY have committed to more than 20 new permanent positions—if the researchers they hire pass muster—after the alliance pays the salaries for the first five years.

Most of the rest of the money will be used for infrastructure, including a data analysis center at DESY. "One university might have a specialty in chip design, and another might have experience in readout electronics," says Heuer. "We want to develop more tools in grid computing and to improve existing infrastructure for detector development." With the alliance, infrastructure will be bolstered, technical support will be added, and scientists at any of the participating institutions will have access to the facilities located at all alliance partners.

DESY



The Big Bang to the present. This schematic shows some states of matter and events as nonlinear functions of time (increasing left to right) and energy (increasing right to left). Particle collisions with energies around 10^{12} eV are the focus of Germany's terascale alliance.

Smaller sums, Heuer adds, will be used to pay replacement lecturers so alliance members can make extended visits to the LHC; promote accelerator science in German universities—which he notes has gone down in the past decades—by freeing up researchers to teach and bringing students to DESY for internships; and contribute to the salaries of trailing spouses. "We try to have a few new ideas for partners who are also scientists," Heuer says. "We are also thinking of holding workshops," adds Mättig. "We want to build up a working atmosphere. At the professor level, we know each other well, but the alliance is aiming at young people."

"I am not absolutely sure, but I think an alliance like this is a novel thing," says Heuer. "Helmholtz centers have large infrastructure. They have general engineering expertise and are focused on large, strategic research. They have more ability to guarantee long-term support [and] sustainability." For their part, universities "have specific expertise, they have scientific diversity, and they create the young blood," he adds. "In order to play a visible role in the global environment, I think one has to combine all this to get a nationwide coherence for particle physics. This is what we are trying to do."

Toni Feder

Workshop aims to double number of women in physics

"When someone says 'physicist,' you see Albert Einstein, not one of us [women]," says Meg Urry, an astronomy professor at Yale University. "When our colleagues are hiring, we all have a picture of someone like Artie