

## Astronomy

# Russian radio telescope set to lift veil on deep space

Russia is set to launch a radio telescope into orbit that will let astronomers peer more clearly into space than ever before. The 10 m RadioAstron telescope, developed by researchers at the Lebedev Physical Institute of the Russian Academy of Sciences in Moscow and the Russian Federal Space Agency, is scheduled to be launched next month from the Baikonur cosmodrome. Once in orbit, it will have a resolution 1000 times greater than the Hubble Space Telescope and millions of times that of the naked eye.

RadioAstron, which has been in development for more than 20 years, will study a range of phenomena, such as the processes taking place within active galactic nuclei (AGN) – compact and highly luminous regions at the centre of galaxies. AGNs are thought to emit radiation as a super-massive black hole deep within the galactic core accretes mass from its surroundings. In addition to measuring the size, structure and dynamics of these radio sources, RadioAstron



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will also investigate the structure of stellar-mass black holes, neutron stars and hypothetical “quark stars” in our galaxy, as well as studying the nature of dark matter and dark energy.

“The resolution should enable us to study the interface between the black hole and radio jet in an AGN,” says Arna Karick from the Astrophysics Research Institute at Liverpool John Moores University in the UK. “There is an awful lot of physics we don’t understand in this regime

### Flying high

Once in orbit, RadioAstron will have a resolution some 1000 times greater than the Hubble Space Telescope.

and RadioAstron may provide the observations needed to test theoretical models.” Once in orbit, with a maximum distance from Earth of 350 000 km, the telescope will unfold the 27 carbon fibre petals that form its parabolic reflector and antenna to circumnavigate the Earth every 9.5 days for its 5–10 year working life.

RadioAstron will achieve its unprecedented resolution by working with ground-based radio telescopes, such as the Lovell Telescope at the Jodrell Bank Observatory in the UK and the US Arecibo Radio Telescope in Puerto Rico, to form a very long baseline interferometry (VLBI). As the data received by each telescope are correlated to produce a single image, the resolution achievable using VLBI is proportional to the greatest distance between telescopes in the array. RadioAstron’s developers predict that the telescope will be able to achieve the same angular resolution as a telescope with a size of the diameter of the satellite’s orbit.

Simon Perks

## Women in physics

## MIT gets good marks for fighting gender discrimination

The Massachusetts Institute of Technology (MIT) has made “significant progress” in increasing the number of female faculty members, with their numbers in science and engineering almost doubling over the last decade. That is according to a new report by a panel set up by MIT’s schools of science and engineering that was commissioned as part of the institute’s 150th anniversary this year. The report also says that MIT has removed some specific burdens on women, such as the need for time off work during pregnancy without it hindering their careers.

The positive findings are a far cry from the mid-1990s, when female scientists at MIT, led by biologist Nancy Hopkins, began to suspect that the institute was giving them less lab space, fewer opportunities for promotion and lower salaries. A survey of 15 tenured women in the school of science confirmed their suspicions, which they took to Robert Birgeneau, who was then MIT’s dean. In 1999 he commissioned a report that found that MIT had discriminated against its female science professors in



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### Reversing the trend

The Massachusetts Institute of Technology was accused of discriminating against its female scientists but it now boasts a female president as well as 15 female deans and five physics professors.

“subtle but pervasive ways”. A second report three years later found a similar situation in the school of engineering.

The new report finds that female scientists and engineers at the institute now have “[a]n overwhelmingly positive view of MIT”. Indeed, MIT now has a female president, the neuroscientist Susan Hockfield, as well as 15 female deans and five physics professors.

However, the new MIT report also highlights two current problems. One is

the perception that many female faculty members were employed because the institute lowered its standards for women. Ed Bertschinger, chair of MIT’s physics department, denies this, writing on his blog *Inventing Our Future* that “the women to whom we have made faculty offers, promoted and granted tenure all meet the very high standards of MIT”. The other problem is that women have extra administrative work because MIT now requires that at least one woman should serve on every committee. This has put pressure on female faculty members because there are so few of them, even though their numbers are increasing.

The report now recommends changing the requirement that every committee must contain a woman, as well as increasing access to and providing financial aid for child care, developing ways to deal with dual-career couples, consulting with women on the appointments of department heads and implementing systems to deal with “gender-based harassment”.

Peter Gwynne  
Cambridge, MA