



MÖBIUS STRIP UNRAVELLED

Mathematicians solve 75-year-old mystery of infinite loop's shape.

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M. C. ESCHER



D. LAMMERS/AP

The abandoned Homestake gold mine will host the world's deepest underground lab.

If approved, the Homestake lab will have campuses at 1,500 and 2,250 metres below the surface, with cavities 50–60 metres in diameter. That would be big enough to handle detectors for the most ambitious searches, says Kevin Lesko, head of the Homestake collaboration and a physicist at Lawrence Berkeley National Laboratory in California. "I'm very excited," he adds.

The selection of Homestake caps a long and highly politicized process. It was first put forward as a candidate in 2001, quickly winning the backing of powerful local politicians such as Senator Tom Daschle, who was then Democratic minority leader. In 2005, the NSF announced that Homestake and a Colorado mine were the finalists for hosting the underground lab, but protests from losing teams caused the process to be reopened.

Even now, there is no guarantee that the Homestake lab will be built. Local billionaire T. Denny Sanford, together with the state of South Dakota, have pledged some \$100 million for an interim site at 1,500 metres, but the deeper facility will require NSF construction money. At present, the agency has approved just \$15 million for a three-year, detailed design study. To win full funding, the design must go before the independent National Science Board, where it will compete with other large projects.

Even so, researchers are pleased that the first steps have been taken, and are hopeful that the lab will be built. "It's clear where the science is going," says Sadoulet. "The frontier is deep." ■
Geoff Brumfiel

Russia pins its hopes on 'nano'

MOSCOW

In what could be the biggest windfall for science since the collapse of the Soviet Union, the Russian parliament last week gave the green light to a massive US\$7-billion investment in nanotechnology over five years. The Russian government hopes the programme will make the country a world leader in nanoscale technologies with a wide range of military and civilian uses.

However, the move has been criticized as poorly prepared and unlikely to yield results.

Nano-devices, designed from single atoms and molecules, are predicted to have applications in fields as diverse as consumer electronics and biomedicine. All research and development activities will be coordinated by Rosnanotekh, a new tax-exempt body with far-reaching freedom to set up institutes, put work out to tender and commercialize results.

But no details have been announced about the precise structure, goals and content of the initiative. It is unclear, for example, how projects will be selected for funding.

Some Russian scientists,

sceptical about fair allocation of funds, have given the announcement a lukewarm response. The country has hardly any competence in nanotechnology, they say. And given the widespread absence of efficient quality control in Russian science funding, many fear the scheme will be poisoned by corruption.

"Our government just doesn't understand anything

"Lack of transparency and programme abuse are the usual Russian dangers."

about science," says one high-level Russian physicist who asked not to be named. "They think if they throw enough money at it they'll get some nice exploitable results in return. But we don't even have the experts."

The programme is the brainchild of Russian President Vladimir Putin, who is keen to reduce the country's dependence on oil and gas.

Putin recently compared the importance of nanotechnology to that of nuclear science. He is said to have secretly recruited Mikhail Kovalchuk,

the director the Kurchatov Institute in Moscow, to head Rosnanotekh.

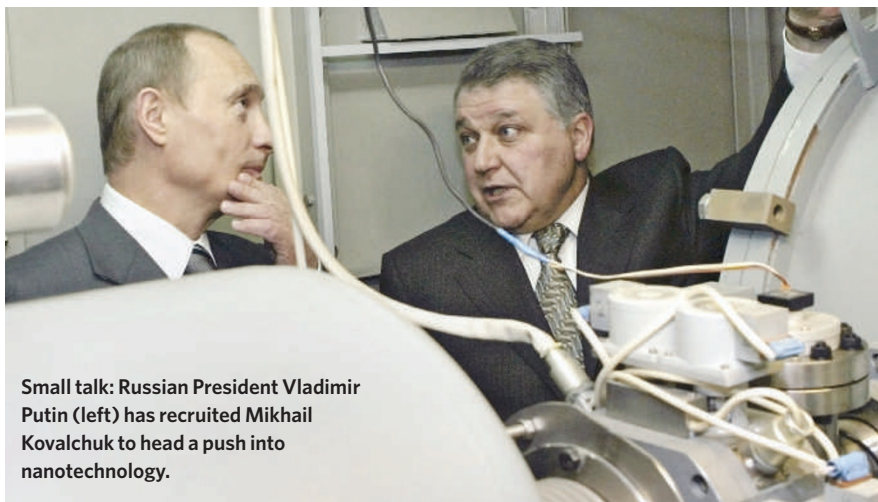
Kovalchuk, who is not an expert in nanotechnology, is the brother of Yuri Kovalchuk, a banker and businessman with close ties to Putin.

The independent Russian media has poured scorn on Russia's foray into what some call the "banano" technology business. "Lack of transparency and programme abuse for personal goals are the usual Russian dangers," says former science minister Boris Saltykov, an expert in science management.

"Risks do exist," agrees Alexander Nekipelov, vice-president of the Russian Academy of Sciences in Moscow. "But the money involved is so huge that scrutiny will be very good this time."

The academy is keen not to be bypassed by the programme, for which the government has set aside more funds than the entire academy receives. In a move that critics say violates its own rules, in June the academy leadership appointed Kovalchuk, who is not a full member, as acting vice-president for nanotechnology. ■

Quirin Schiermeier



Small talk: Russian President Vladimir Putin (left) has recruited Mikhail Kovalchuk to head a push into nanotechnology.

M. KLIMENTYEV/RIA NOVOSTI/PRESIDENTIAL PRESS SERVICE/AP