Quantum wormholes could carry people

23 May 2002

By **Charles Choi**

All around us are tiny doors that lead to the rest of the Universe. Predicted by Einstein's equations, these quantum wormholes offer a faster-than-light short cut to the rest of the cosmos – at least in principle. Now physicists believe they could open these doors wide enough to allow someone to travel through.

Quantum wormholes are thought to be much smaller than even protons and electrons, and until now no one has modelled what happens when something passes through one. So Sean Hayward at Ewha Womans University in Korea and Hisa-aki Shinkai at the Riken Institute of Physical and Chemical Research in Japan decided to do the sums.

They have found that any matter travelling through adds positive energy to the wormhole. That unexpectedly collapses it into a black hole, a supermassive region with a gravitational pull so strong not even light can escape.

But there's a way to stop any would-be traveller being crushed into oblivion. And it lies with a strange energy field nicknamed "ghost radiation". Predicted by quantum theory, ghost radiation is a negative energy field that dampens normal positive energy. Similar effects have been shown experimentally to exist.

Delicate balance

Ghost radiation could therefore be used to offset the positive energy of the travelling matter, the researchers have found. Add just the right amount and it should be possible to prevent the wormhole collapsing – a lot more and the wormhole could be widened just enough for someone to pass through.

It would be a delicate operation, however. Add too much negative energy, the scientists discovered, and the wormhole will briefly explode into a new universe that expands at the speed of light, much as astrophysicists say ours did immediately after the big bang.

But sending a person would be another thing. To keep the wormhole open wide enough would take a negative field equivalent to the energy that would be liberated by converting the mass of Jupiter.