

Scientists get together to probe holes in our material world

Richard Macey

It was once the stuff of science fiction movies, with aliens armed with ray guns battling for control of the universe. Now Australia is to get its own centre dedicated to investigating antimatter.

The Centre of Excellence in Antimatter-Matter Studies will bring together 30 scientists from science institutions and

universities around the country. Antimatter is not easy to work with. Whenever it comes in contact with normal matter – the particles animals, plants and our world are made of – they destroy each other. However, the scientists hope to harness antimatter's destructive nature to learn more about physics and chemistry.

Dr Lou Vance, a scientist at the Australian Nuclear Science and

Technology Organisation at Lucas Heights, believes antimatter research could help in developing leak-proof materials for encasing nuclear waste. Some of the toughest materials had nanoholes, tiny gaps in their molecular structures that could allow small amounts of radioactive waste to leach out, he said.

By firing antimatter positron beams into various solids, the

scientists hope to discover how solid they really are.

If a positron – the antimatter version of the ordinary electron – slams into material filled with nanoholes, it will initially zoom through, and the positron will be relatively long-lived. But if it hits material with only a few nanoholes the particle will be quickly stopped, destroying itself and an electron from the material. In

each case the collision will release a tell-tale gamma ray, alerting scientists that particles of normal matter and antimatter have destroyed each other.

Positrons can be made in linear accelerators, or by the radioactive decay of a man-made isotope called sodium-22.

Dr James Sullivan, of the Australian National University, said the research technique could

also develop pill capsules with holes just the right size to release drugs slowly into the body.

Launched with \$7 million from the Australian Research Council, the antimatter centre will include the Australian Nuclear Science and Technology Organisation, the Australian National University, the CSIRO, the University of Western Australia, and Flinders, Griffith and Murdoch universities.