

## India joins N-fusion reactor club

*A sheer waste of money and effort ... there has been no real progress since 1958 because there has been little effort on theoretical physics. It has all been fiddling with magnets. India is now sucked in to the black hole.*

The Times of India  
April 26, 2006

India will manufacture about 10 per cent of the machines to be used in the futuristic nuclear fusion reactor, ITER (International Thermonuclear Experimental Reactor). These will be manufactured by Indian companies to the specifications of the international group. When it is fully operational, ITER is expected to generate 500 million watts of heat from a sustained fusion reaction.

For India, the latest entrant to ITER, it a big energy booster for Indian scientific and manufacturing capabilities, said Professor P.K.

Kaw, of the Institute of Plasma Research. "We have saved about two decades of development by participating in ITER," he said to TOI.

Institute of Plasma Research is the nodal agency for ITER in India and will soon be designated as such. In the separation plan announced by the government as a result of the India-US nuclear, the IPP has been declared a civilian entity, "irrelevant" of safeguards, which opens it up to international cooperation.

The Indian participation in ITER therefore will be in the form of technological contributions rather than cash. India's participation in ITER has actually injected fresh life into the scientific community. Kaw said India wants to learn about the other machines that will be made by other countries and even work with them on experiments and research.

From being an ambitious idea, ITER is standing on the verge of reality, and the excitement of excitement of being on the crossroads of tech history is heady. Jean Jacquinet, adviser to the French high commissioner of atomic energy, said here last week, "Its remarkable that more than half the world's population will be represented in ITER. Its perhaps a precedent on how the world should respond to emergent challenges.."

On May 24, the seven ITER partners, said Jacquinet, will initial a document in Brussels formalizing the organization and its statutes. In November, ministers from these countries will meet \_\_ possibly at Cadarache, France which is the site for the reactor \_\_ to sign in ITER.

Its still horrendously expensive, and in many ways, still a technology that needs to be proved.

But Kaw said science had now advanced to such a level that we have a better idea of how nuclear fusion technology should perform. "The machine, for instance is now losing heat faster than before.

"We are confident that if we scale the device to a certain size it can perform. There are still some areas in which work is required and that is what we will do now. But there has

been a lot of progress in the past 15 years," said the scientist, barely able to contain his enthusiasm.

As a result of global collaboration in physics, "in confining these hot gases that we call plasma \_\_ we can now extrapolate the results into a nuclear reactor," said Jacquinot. "It's quite remarkable," he said "that the world agreed on the scientific objectives and on the organization."

How many years before we can turn on a light bulb by nuclear fusion? By 2050, is a conservative estimate. However, Russian scientists are more optimistic. Last week the head of the Kurchatov Nuclear Research Centre went on record to predict that the world could see its first thermonuclear power plant by 2030.

What's the next step?

Kaw and Jacquinot both agreed that once a new machine "demo" has been built and can demonstrate the "reliability and industrial aspects of the process," you can think of deploying a prototype.