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CORDISNews

European physicists propose 735 million euro alternative to ITER

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A panel of laser physicists from seven European countries has put forward proposals for a new 735 million euro facility to study an alternative approach to nuclear fusion than that which will be tackled by the international thermonuclear experimental reactor (ITER).



The provisionally titled HiPER facility would be based on 'fast ignition' laser fusion technology, in which two separate lasers are used to compress and heat a small capsule of deuterium and tritium until the nuclei are hot enough to undergo nuclear fusion, producing helium and neutrons. The energy of the neutrons is then used to generate electricity without the production of greenhouse gases or nuclear waste. The panel of scientists says that the facility could also be used to support experiments in other areas of physics.

Currently, the most advanced approach to nuclear fusion uses magnetic fields to compress the deuterium-tritium plasma, and is the method that will be investigated within ITER. An third approach based on 'inertial confinement' will be tackled at facilities in France and the US, where a single laser or ion beam is used to compress and heat the fuel plasma. However, it is believed that the main focus of both these facilities will be nuclear weapons research.

Fast ignition was first demonstrated at Osaka University in Japan in 2001 by Ryoosuke Kodama, in collaboration with colleagues from the Rutherford Appleton Laboratory in the UK. According to Henry Hutchinson of the Rutherford Appleton Laboratory, who set up the European panel that is now proposing HiPER, fast ignition requires less laser energy than the conventional inertial confinement approach, and would thus be considerably cheaper.

'The energy problem is sufficiently urgent that we cannot afford to ignore different approaches to fusion,' says Professor Hutchinson. He also stressed that the HiPER laser would be a civilian facility, and would therefore also be available for separate research into astrophysics, atomic physics and nuclear physics.

The challenge now facing Professor Hutchinson and the international panel of scientists is to convince research councils across Europe to support their proposal. If they are successful, the team says that construction of the HiPER facility could begin by the end of this decade.

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