Tuesday Colloquium

"Nuclear Fusion" – The World Scenario and Indian Efforts

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Abstract

Fusion is the process that takes place in the core of our Sun. What we see as light and feel as warmth is the result of a fusion reaction: Hydrogen nuclei collide, *fuse* into heavier Helium atoms and release tremendous amounts of energy in the process. 20th century fusion science has identified the most efficient fusion reaction to accomplish in the laboratory setting: the reaction between two Hydrogen (H) isotopes Deuterium (D) and Tritium (T). The D-T fusion reaction produces the highest energy gain at the 'lowest' temperatures. At extreme temperatures, electrons are separated from nuclei and a gas becomes plasma - a hot, electrically charged gas. International Thermonuclear Experimental Reactor—ITER is a large-scale scientific experiment that aims to demonstrate that it is possible to produce commercial energy from fusion. In ITER, the fusion reaction will be achieved in a **tokamak** device that uses magnetic fields to contain and control the hot plasma. The fusion between Deuterium and Tritium (D-T) will produce one Helium nuclei, one neutron and energy. The Helium nucleus carries an electric charge, which will respond to the magnetic fields of the tokamak, and remain confined within the plasma. However some 80% of the energy produced is carried away from the plasma by the neutron which has no electrical charge and is therefore unaffected by magnetic fields. The neutrons will be absorbed by the surrounding walls of the tokamak, transferring their energy to the walls as heat.

In the present talk focus will be on the world fusion energy scenario and the Indian efforts in this direction.

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Time: 4.00 PM

Venue : **PF-AG 14, Seminar Room, Prefab**

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