

## **Press Release**

### **Massachusetts Institute of Technology (Laboratory for Nuclear Science)**

In early February 2010, M. V. Kovalchuk, Director of the Kurchatov Institute announced to a meeting with the scientific attachés of the European embassies in Moscow that an initiative aimed at developing a fast paced joint research program in nuclear fusion research was strongly supported by the Governments of Russia and of a “European Country”. In fact this program had been included in the Italy-Russia summit meeting in Rome on December 3, 2009. The original proposal had been initiated earlier by E. Velikhov (President of the Kurchatov Institute) and B. Coppi (Head of the High Energy Plasmas Undertaking, M.I.T.) building upon a lifelong friendship and a history of fruitful collaboration. This has been particularly intensive during the early developments of the Alcator program at MIT where well known scientists of the Kurchatov Institute made key contributions to experiments that identified the unique confinement and purity properties of the high density plasmas produced by the high field Alcator machine. In effects this investigated, for the first time, physical processes leading to attain self-sustained fusion burning plasmas.

The collaboration with the Kurchatov Institute is directed at the construction of the Ignitor machine, the first experiment proposed to achieve ignition conditions by nuclear fusion reactions on the basis of existing knowledge of plasma physics and available technologies. Ignitor is part of the line of research of high field, high density experiments that began with the Alcator machines at M.I.T. and the Frascati Torus program in Italy; it is the only one to have a design capable of attaining ignition regimes at the present time.

According to existing plans, Ignitor will be installed at the Triniti site at Troitsk near Moscow that has facilities which can be upgraded to house and operate the machine. This site will become open and made to be easily accessible to scientists of all nations. The management of the relevant research program will involve Italy and Russia only to facilitate the success of the enterprise.

The proponents have suggested that the U.S. become an Associate Member of this effort with a similar arrangement to that made with CERN for its participation in the LHC (Large Hadron Collider) Program.

The goal to produce meaningful fusion reactors in a reasonable time leads to pursuing the achievement of ignition conditions in the near term in order to understand the plasma physical regimes needed for a net power producing reactor. In addition, an objective other than ignition that can be envisioned for the relatively near term is that of high flux neutron sources for material testing involving compact, high density fusion machines. This has been one of the incentives that have led the Ignitor Project to adopt magnesium diboride ( $\text{MgB}_2$ ) superconducting cables in the machine design, a first in fusion research. Accordingly, the largest coils (about 5 m diameter) of the machine will be made entirely of  $\text{MgB}_2$  cables.

In the context of the Italy-Russia summit meeting held today (April 26) in Milan the agreement to proceed with the proposed joint Ignitor program has been signed. The participants, from the Russian side, have included the Prime Minister V. Putin, the Deputy Prime Minister I. Sechin, the Energy Minister S. Shmatko, and the V-Minister of Education and Research S. Mazurenko. Participants from the Italian side have included Prime Minister S. Berlusconi, the Foreign Affairs Advisor to the Prime Minister V. Valentini (who had a key role in forging the agreement on the Ignitor program), and the Minister of Education and Research M. Gelmini who, together with S. Mazurenko, signed the agreement in the presence of the two Prime Ministers.

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