

**LABORATORI NAZIONALI DEL GRAN SASSO**

**SEMINAR ANNOUNCEMENT**

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***Physics cases of  
LUNA MV***

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*In the last century, astrophysicists developed models able to describe the abundance of chemical elements in the Cosmos by using the nuclear cross sections of involved reactions measured in the laboratory.*

*From the nuclear point of view, the main experimental problem to measure thermonuclear reactions in a laboratory is their very low cross sections. These ones guarantee millions or billions years in terms of star lifetime but, at the same time, make direct measurements in nuclear laboratories practically impossible, given that the signal is completely covered by the background.*

*Thus, the only way to measure directly the thermonuclear fusion cross sections in the astrophysically relevant energy region is to measure inside deep underground laboratories, such as LNGS.*

*Here, in 1991, a 50kV accelerator (LUNA 50 kV) was installed allowing, for the first time, to investigate reactions within the Gamow peak of the Sun. In 2000 a new 400 kV accelerator (LUNA 400 kV) was installed in order to investigate mainly reactions belonging to the CNO, Mg-Al and Ne-Na cycles of Hydrogen burning.*

*The natural next step for such a research (LUNA MV) is to install a 3.5 MV machine in order to investigate reactions belonging to the helium burning and the so-called neutron source reactions that provide the neutron flux necessary for the s-process, responsible of the production of more than half of the elements heavier than iron.*

*In this seminar the physics cases of LUNA MV as well as the status of the project will be outlined.*

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**LNGS - “B. PONTECORVO” ROOM**