

THE STATUS OF SNOLAB: A NEW INTERNATIONAL FACILITY FOR ASTROPARTICLE PHYSICS*

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We present the status and scientific programme for SNOLAB, a new International Facility for Astroparticle Physics, presently nearing completion 2 km underground in Canada.

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1. Introduction

The past few years have been witness to great advances in the field of Astroparticle Physics. We have a new understanding of neutrinos and a universe dominated by Dark Matter and Dark Energy.

Experiments will probe this field by searching for Dark Matter, Neutrinoless Double Beta Decay, and low energy solar neutrinos. Such experiments have in common the need for very large detectors, low energy thresholds and ultra low background rates. Hence the need for clean deep underground laboratory space like SNOLAB.

2. Description

SNOLAB was designed to be able to accommodate three to four large scale (order 1000 tonne) and several smaller sized experiments. The large spaces are the existing SNO cavern, a new "Rectangular Hall" and "Cryopit". The latter has high pressure bulkheads to allow safe operation with large volumes of cryogenic fluids or noxious gasses. Mid-sized experiments will be supported in the Ladder labs. The Ladder labs and Rectangular Hall were excavated first in Phase I, with the Cryopit developed a few years later in Phase II. The new facility will have three times the space of the original SNO facility. SNOLAB also has a new research building on surface, which has been occupied since 2005.

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SNOLAB also provides a significant amount of infrastructure. In addition to basic services, SNOLAB has an ultrapure water system, low background counting facilities, chemistry labs, and a clean transport mechanism. The facility will be operated by about 40 scientists, engineers and technical staff that are highly skilled in underground operations through working on the SNO project.

3. Status

The raw excavation of Phase I is 100% complete. Excavation of the Cryopit and its utility drifts began in August 2007 with excavation to be complete by May 2008. The outfitting of Phase I is progressing very well, and should be complete by February, 2008. When the Cryopit excavation is complete in May of 2008, the dirtiest work will be finished. At that point the Phase I outfitting will also be complete, and the first beneficial occupancy in the lab can take place.

SNOLAB held a series of workshops to define the experimental program. Approximately 25 letters of intent were received and examined by an international experimental advisory committee. An initial suite of experiments has been selected. The experiments presently being considered for installation or prototyping within the next two years are summarized below.

TABLE I

Proposed initial experimental program.

Experiment	Physics	Status
PICASSO Ib	Dark Matter	Prototype in operation
DEAP I	Dark Matter	Commissioning in SNOLAB
MiniClean	Dark Matter	Install 2008
DEAP/CLEAN	Dark Matter	Install 2008/2009
SuperCDMS	Dark Matter	Relocate to SNOLAB 2009
SNO+	$0\nu\beta\beta$ Decay	Engineering/design
EXO	$0\nu\beta\beta$ Decay	R&D in progress 2009
HALO	Supernovae	Seeking funding
PUPS	Seismicity	Installed and operational

4. Conclusions

SNOLAB is nearing completion. Two experiments are already running prototypes in the original SNO area and many others have been approved for installation in 2008. SNOLAB will be a world leading Astroparticle Physics facility, the deepest and cleanest facility in the world. Discoveries made at SNOLAB have the potential to be of the greatest fundamental importance. The future for Astroparticle Physics at SNOLAB is very bright.