

	<b><u>Working Groups</u></b>	<b><u>Experiments</u></b>	<b><u>Themes</u></b>
#1	Dark Matter	CDMS XENON LUX LAr HPSG COOUP CLEAN	The direct detection of Dark Matter is addressed by various techniques. What is this dark matter that binds the galaxies? Although physicists have studied ordinary matter—atoms—in detail, nothing they have seen so far has the right qualities for dark matter. Discovering what dark matter really is stands as one of the major challenges in science today.
#2	Long baseline/Nucleon Decay	MMM LAr	Building on the discoveries of neutrino oscillation studies using solar, atmospheric and reactor neutrinos, a large detector in DUSEL would measure much more precisely neutrino mixing angles and mass parameters. In addition, the neutrino mass hierarchy (ordering of masses) and value of the CP violating phase could be unambiguously determined using an intense wideband neutrino beam with appropriate detector. This detector is a natural match for a next generation proton decay experiment and a wide range of other physics.
#3	Neutrinoless Double Beta Decay	EXO 1-Tonne Ge COBRA MOON Low Pressure Xe	The detection of neutrinoless double beta decay is also addressed by various techniques. Neutrinoless double beta decay experiment is unique in discerning whether the neutrino is its own antiparticle (also known as being a Majorana neutrino).
#4	Nuclear Astrophysics	UG accelerator	The principal goal of an underground High Current Ion Accelerator (HCIA) is to empirically quantify the cross sections for nuclear fusion reactions that are important for energy production in stars, with particular emphasis on those reactions that are responsible for the flux of neutrinos with energies above those from the pp fusion in the Sun.
#5	1-km vertical space	N-Nbar Cloud Physics Atom interferometry Diurnal rotation rate of Earth	There are a number of proposals that would make use of a large vertical space. These include neutron-antineutron oscillation, which is a key test of an unexplained but fundamental symmetry, baryon number conservation; the precise study of the diurnal rotation of the Earth; the study of small cloud formation.
#6	Gravity Waves		The search for gravity waves requires an environment that is isolated from the seismic noise associated with activity on the surface of the Earth. An underground experimental

**Working Groups****Experiments****Themes**

site has significant advantages.

#7 Low Background Counting

A low background counting facility would have broad application for a number of experiments, in particular for material screening.

#8 Solar Neutrinos

LENS  
CLEAN  
MOON

The study of solar neutrinos began as an effort to directly verify calculations indicating that nuclear reactions powered the sun. It evolved into historic discoveries about the basic properties of neutrinos. The current program is the development of real-time, precision experiments that measure the spectrum of solar neutrinos down to the earliest and lowest energy part of the chain, from proton-proton (pp) fusion.

#9 Studies of effects of energetic particles on electronic devices, biological systems, materials and development of structure imaging from cosmic ray

Studies of effects of energetic particles on electronic devices, biological systems, materials and development of structure imaging from cosmic rays