AARM Collaboration Meeting

DUSEL Update

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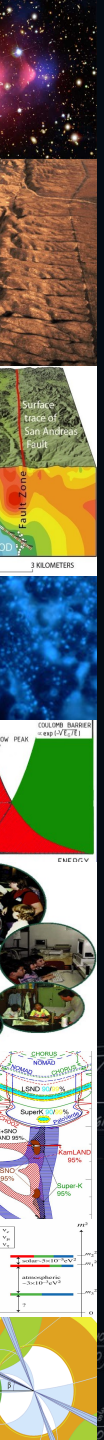
November 12, 2010



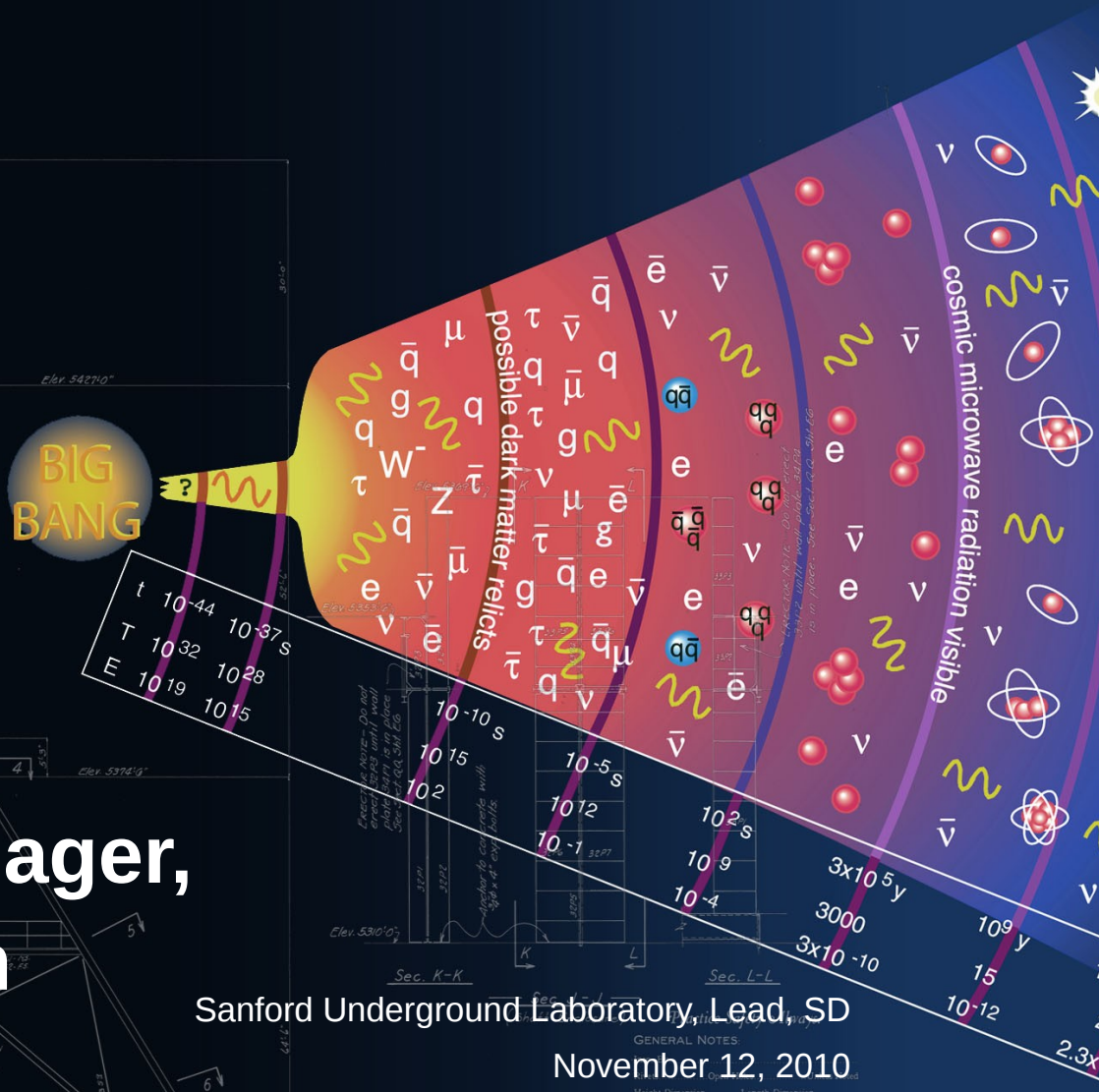


Figure Courtesy PDG and LBNL

Agenda

Status of the DUSEL Preliminary Design Report (PDR) for NSF MREFC Project

PDR Definition of DUSEL Project

Layouts

Plans for DUSEL Science Liaison Group for 2011

Discussion of current issues

Collaborative studies

AARM Issues

PDR Status and Schedule

Major internal review(□25 reviewers, agency observers) completed late October. Many action items and comments

Science volume – second draft in progress post review

Final draft PDR December 2010

Internal review late December 2010

Aim to have PDR complete by end January 2011, final internal review

Aim for submission in February 2011

Agency reviews April to summer

NSF prepares in parallel package for consideration by National Science Board action by Fall to end of 2011

MREFC Construction Start FY2014 planned

PDR Definition of DUSEL Project

MREFC Scope:

Supporting infrastructure, in conjunction with LBNE

2 MLL Lab Modules

1 DLL Lab Module

Other Levels and Ramps

MREFC Project Cost:

$875M($FY09)

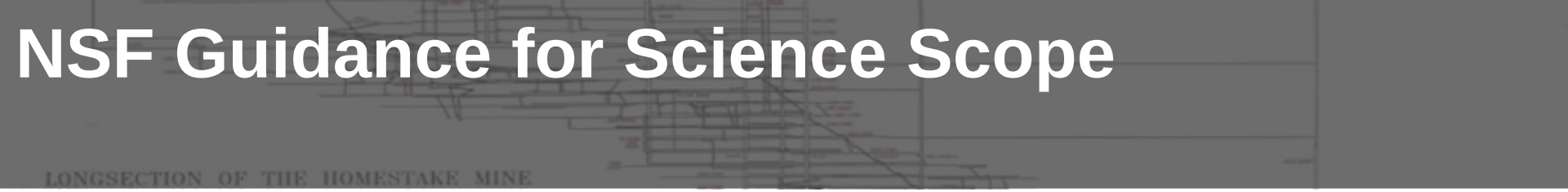
- $575M for facility
- $300M for science: $125M for LBNE, $175M for other science

Contingency at ~42%

Schedule

Will not have final dates for completion of lab modules and LBNE (ready for expts.) until December/January

NSF Guidance for Science Scope



Diverse and Compelling Suite of Experiments

- Long Baseline Neutrinos
- Proton Decay
- Neutrinoless Double Beta Decay
- Dark Matter Searches
- Additional Compelling Physics Experiments
- Biology, Geology, Engineering Experiments
- Education and Outreach Program

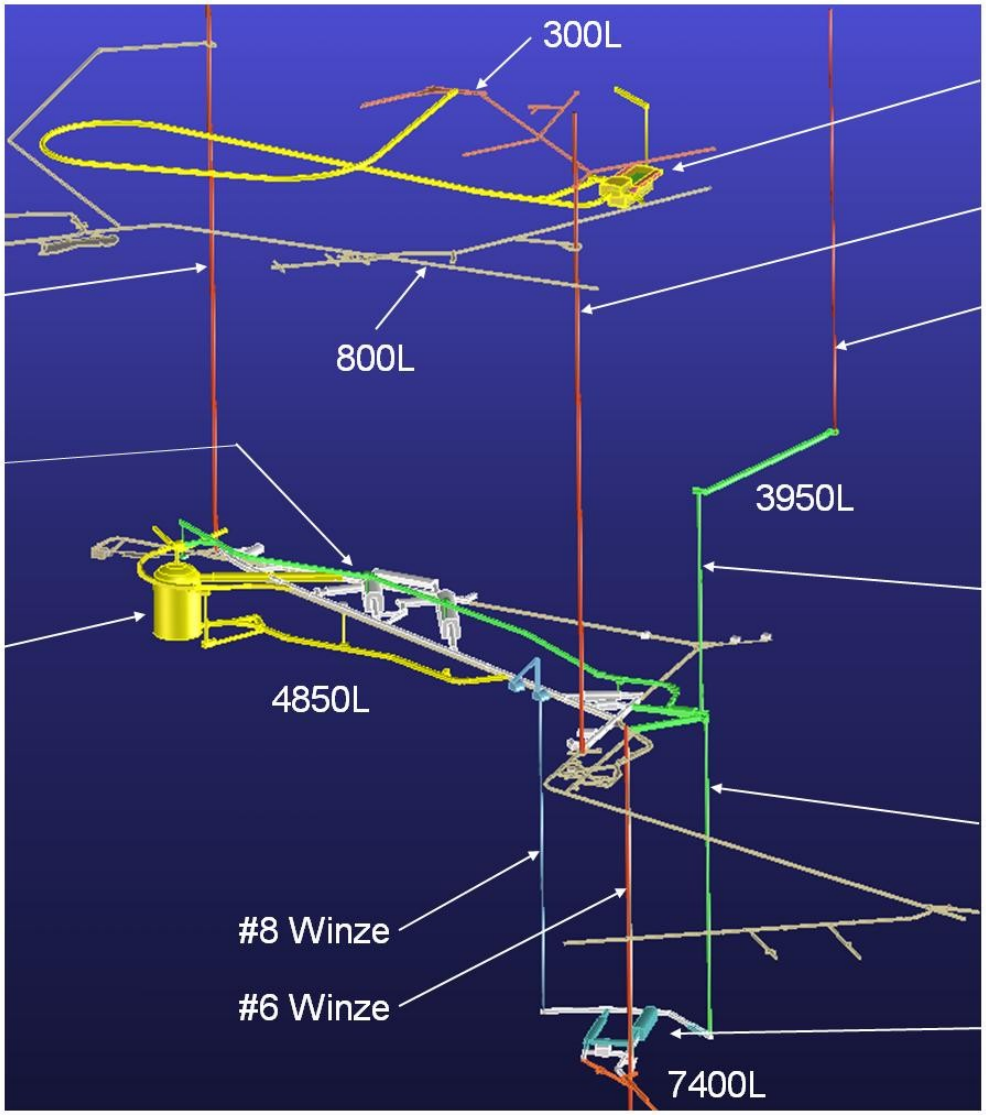
NSF and DOE Roles

A JOG has been formed, stewardship model has been established

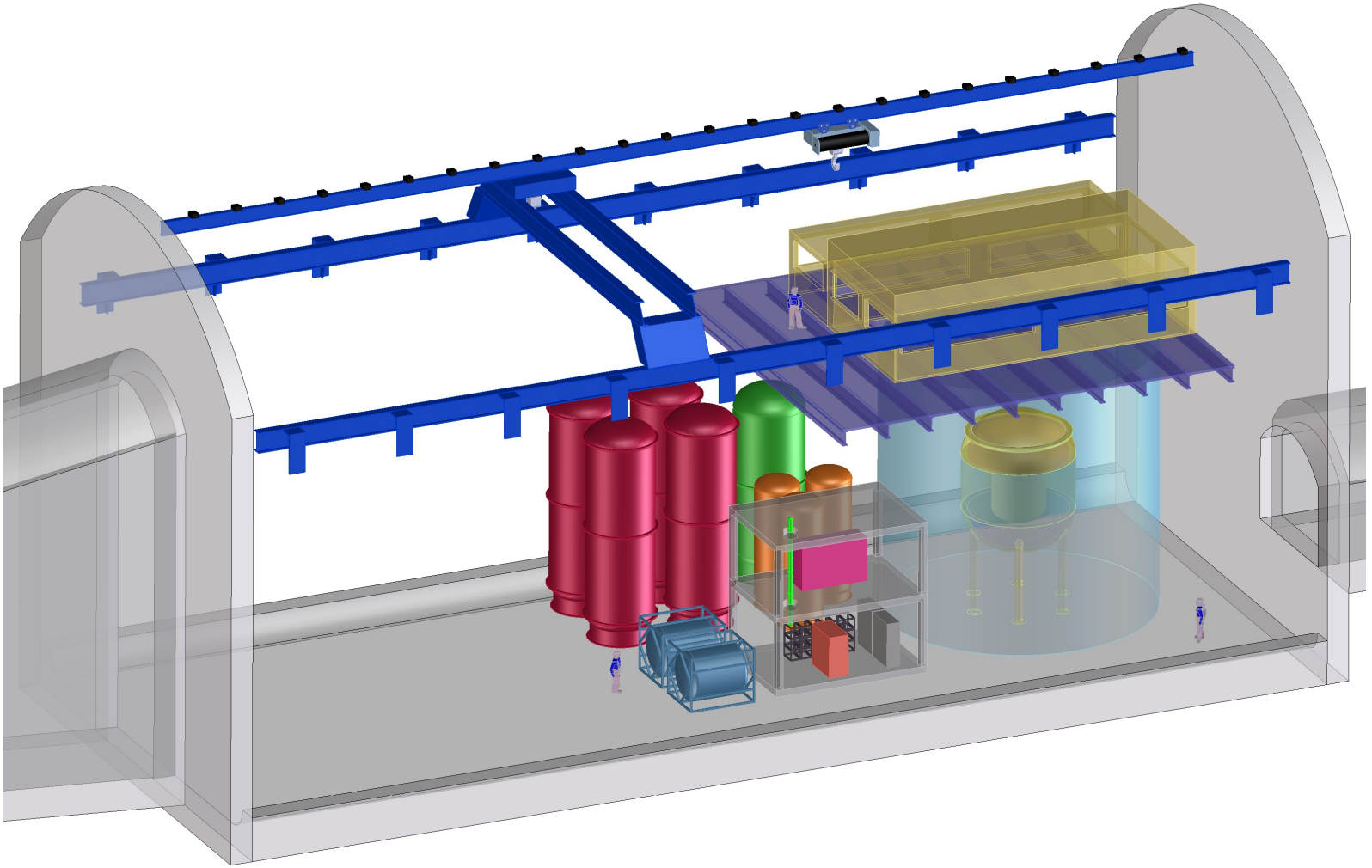
DOE participating in facility design: layout, geo-technical characterization, type and location of detectors associated with LBNE

U.S. Agency Roles and Stewardship		
Program Element	**Steward Agency**	**Partner Agency**
DUSEL facility	NSF	DOE
Dark-matter experiments	NSF	DOE OHEP
$0\nu\beta\beta$	DOE ONP	NSF
Long-baseline neutrino and proton decay	DOE OHEP	NSF
Nuclear astrophysics	NSF	DOE ONP
Advanced low background and other physics	NSF	DOE
Biology, geology, and engineering experiments	NSF	DOE(BES/BER)

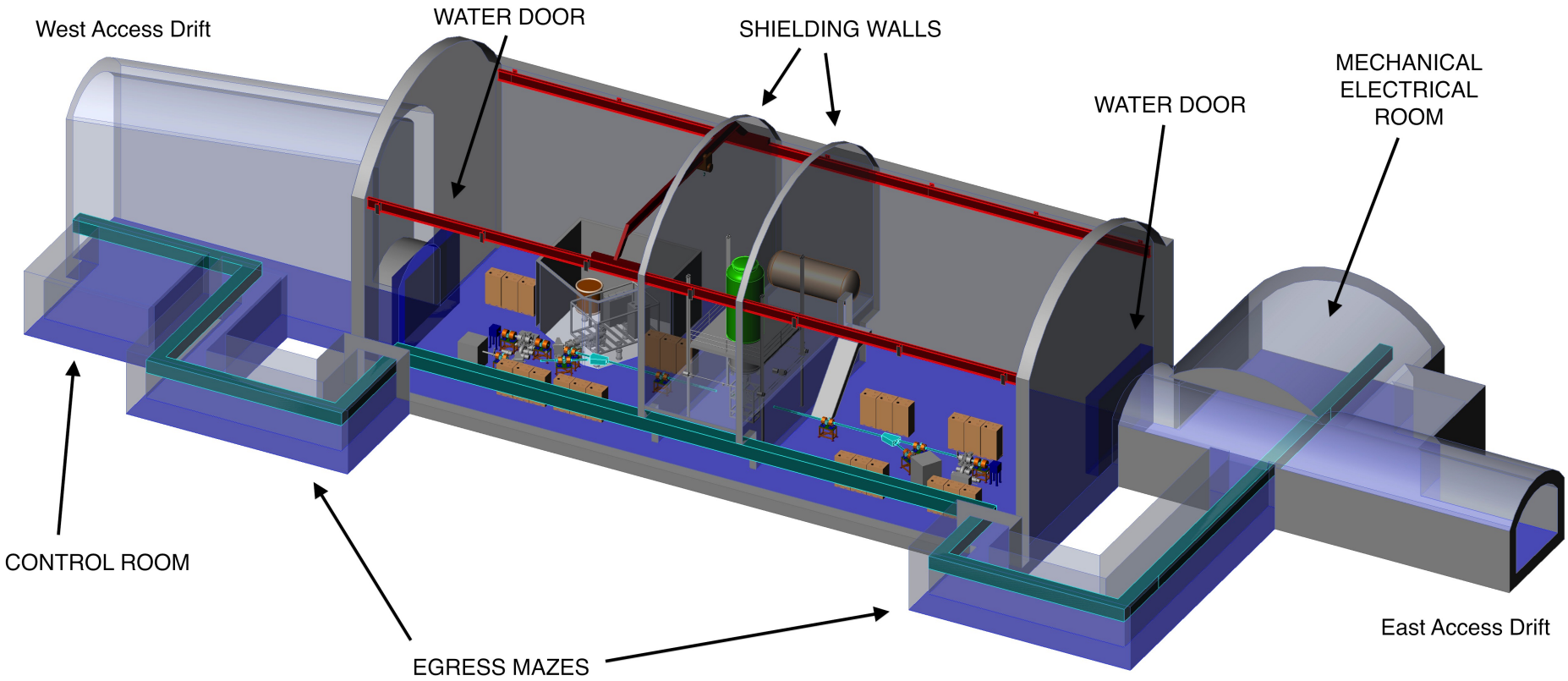
DUSEL Overall Layout



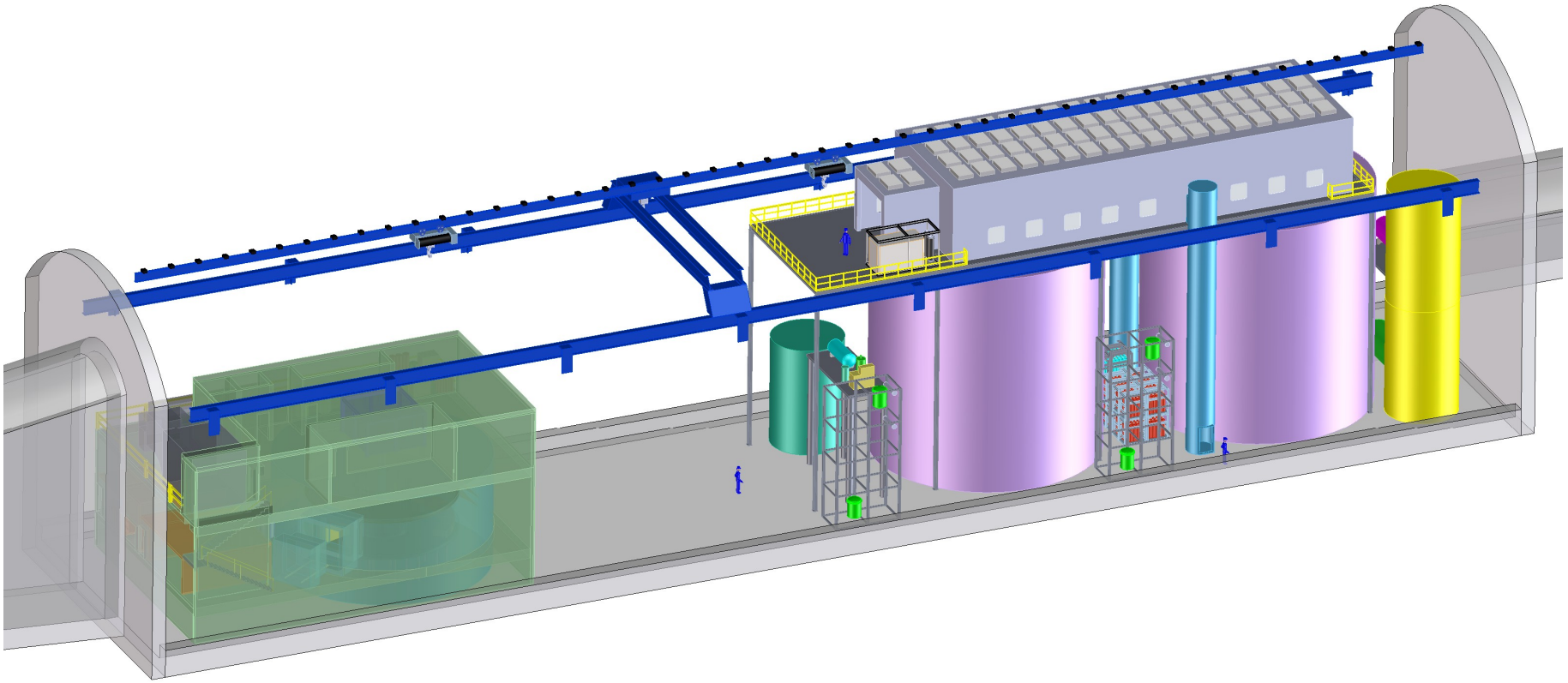
MLL LM1 – with LZD Installed



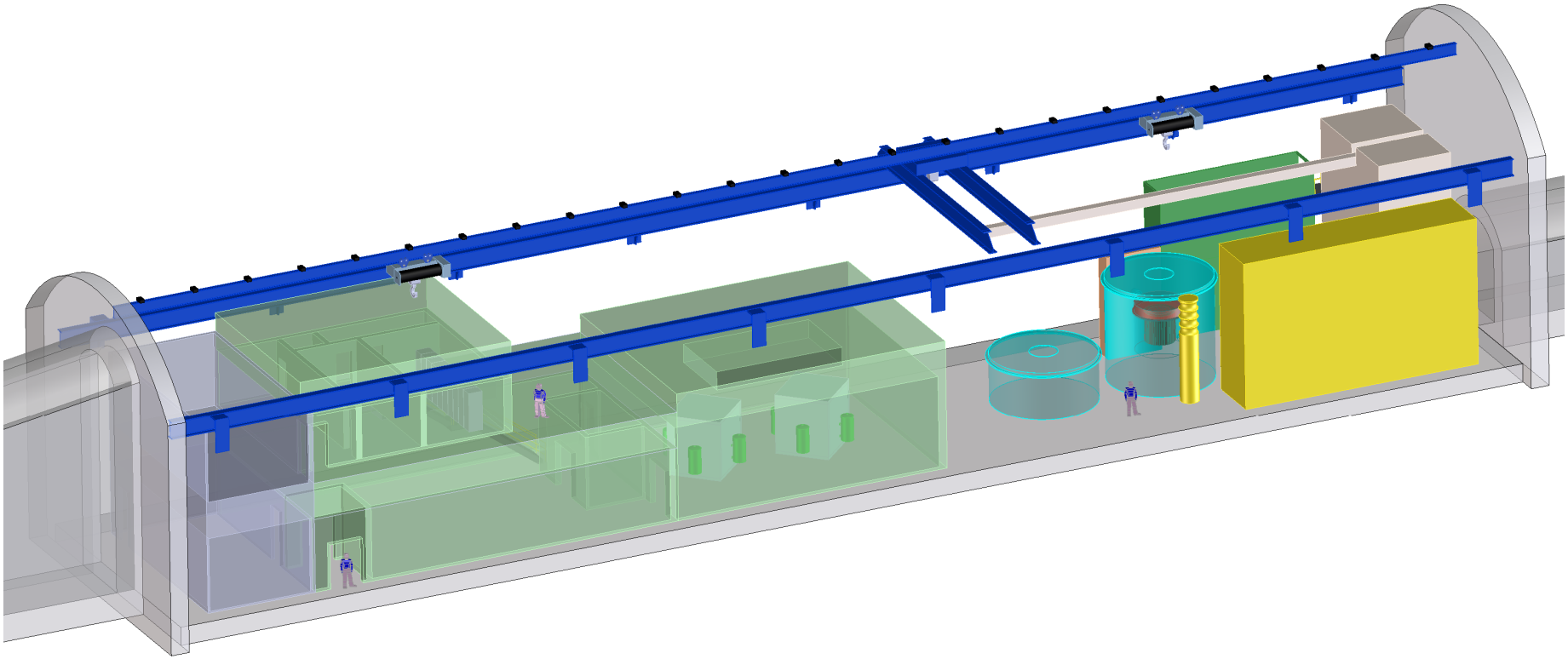
MLL LM1 - Modified for DIANA Installation



MLL LM2 – MAX, FAARM Installed



DLL LM1 – GeODM, 1T Ge Installed



Current Science Integration Issues

Well aware that experimental community desires more space (and associated infrastructure) underground

Obvious tension with overall facility cost envelope and need to understand LBNE civil construction

Modest enhancements made since April NSF review(revised LM1 to be generic(larger), increased height of LM1/LM2, added significant crane capacity to LMs).

Evaluating use of lay-down/staging areas for civil construction as future R&D and/or additional underground fabrication/shop space.

Documented in PDR trade studies for 4850L LM2, cost impact of ~20% increase in width/height/length and addition of LM(including staged)

Desire most acute at 7400L. Similar study of ~20% increase in width/height/length, but needs to be informed by ongoing design studies and recognition of uncertainties until access to 7400L is achieved in 2012 and geotechnical studies done.

How best to proceed on dedicated LM design for DIANA

Current Science Integration Issues

Concerns about the scope of future experiment program and related funding are a recurring theme but mostly above the pay grade of the science integration team.

The facility/civil construction need for requirements can only be addressed well by an engineering (and/or experienced technical physicist) team, informed by a higher-level vision of the scientific goals.

S4 teams are busy with ongoing or near-term experiments

There is a wide range of engineering/technical experience/capability available to the different teams.

LBNE is unique in that this effort has substantial engineering and technical resources that are becoming integrated into the DUSEL facility design team. And this will grow rapidly in the next year.

Challenge for other S4s (and the DUSEL science integration team): how to create an engineering/technical team that can present a unified set of requirements and interact regularly whilst retaining the desirable features of competition.

Expected Status by mid - 2011

Preliminary Design Report will have been completed

Generic Integrated Suite of Experiments described in PDR.

Definition of ISE based on preliminary interactions with proponents (S4 awardees and others), considerations of available funding and other constraints.

Experimental requirements, based on the above, captured in detail and process for same well established.

LBNE CD1 review completed

Improved understanding of LBNE civil construction needs/funding

High-level envelope of scope, cost (range), schedule of potential experiments established by NSF + DOE

No specific experiments selected (possible exception is LBNE technology choice or reduction in options)

Facility Design Interface in 2011

Continued review of PDR, joint LBNE/DUSEL review

LBNE Project will be advancing from CD1 towards CD2

Options eliminated by CD2

Support joint work on facilities design and interface to detectors

Other physics(and BGE)Potential experiment designs will advance.

Cycle through S4 and other experiments 1-2 times and update facility requirements in preparation for Final Design expected to start in 2012.

Trade studies and design options -critical

Participate in continued value engineering process

Examples of Specific Studies

Collaborative engineering involving experiments and DUSEL Science Liaison

Use of liquid scintillator

Workshop in August 2010 with proponents/EH&S feedback

Follow-up during 2011

Assembly studies

Quick study for EXO at 7400L done

4850L study starting late summer (proposed with Dark Matter expts.)

- Scintillators, water shields, clean rooms, etc.

Expanded studies of assembly during 2011

Backgrounds

Proposing workshop on cosmogenic backgrounds and implementation of radon reduction. Tentatively March 2011

Radioactivity measurement and reduction(rock, concrete, shotcrete..)

Community Interactions in 2011

Provide information to experimental community about facility and evolving design.

Expansion of current facility interface activities, with stronger basis (PDR)

Regular meetings essential (but avoid overload)

Work with DuRA. Workshops, etc.

PAC review of experiments, how and when to be developed in coming months. Expect to have guidelines by late summer 2011

Some Issues Specific to AARM

FAARM has aspects that should be part of general DUSEL support but also much more advanced goals.

How will this be phased?

Connection with Early Science?

Initial Screening for Construction of other Experiments

Next Generation R&D

How will this relate to DUSEL General Purpose Facilities: Clean machining, Clean assembly, R&D Space