

ND-GAR STRATEGY

BACKGROUND

- We've had a number of developments and discussions recently on ND-GAr, including:
 - Maturation of the ND-GAr magnet and ND-GAr-Lite documents from the proto-consortium
 - Continued dialogue with ASG
 - New timelines for DUNE ND following profiling of US LBNF/DUNE project
 - Continued/renewed interest/inquiry into DUNE's overall strategy regarding the muon spectrometer and ND-GAr (Lite) from many parties (including "ourselves").
- While the specific timescales and goals are still not entirely clear to me, it is clear to me that there is a urgent need to gather what we know now and reformulate a strategy in response to these recent developments.
 - The process would naturally bring together and continue from the ongoing activities (e.g. 1-3) to respond to 4 above.
 - Our first audience is ourselves/collaboration
 - We should also need to prepare for a dialog with funding agencies (including the DOE)

FROM LBNC REPORT

DUNE must go into CD-1RR with a clear, crisp statement of its plan for the Day 1 ND. DUNE's plan, which we endorse, includes the TMS, SAND, and ND-LAr detectors, and the PRISM movement system.

Longer term, replacement of TMS by ND-GAr will be required for DUNE to reach its ultimate sensitivity. LBNC would like to see a clear strategy of how DUNE will ultimately transition from the Day 1 configuration to ND-GAr for Phase Two, and notes that ND-GAr-lite would provide one attractive path for this transition.

Proposed Ground Rules

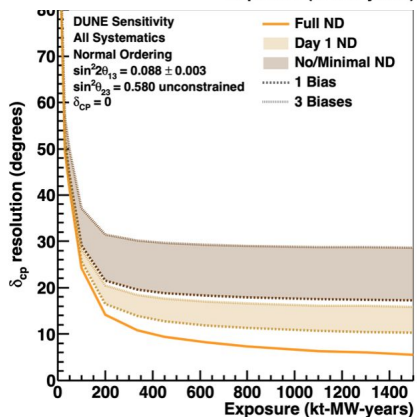
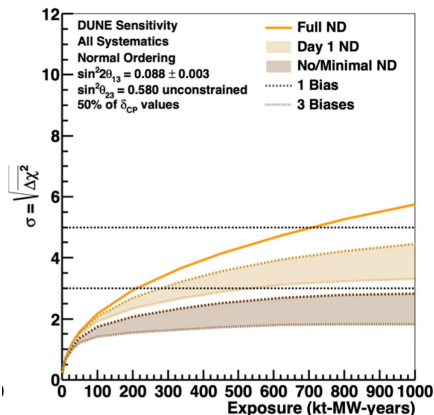
- This is a process . . .
 - we have some answers
 - Other things will not be resolved by meetings alone.
- Stay focussed on ND-GAR
 - We can talk about many other related things (why is ND last, why is everything so late, how do we compete with HK, why is there money for this and not that, etc.).
 - We're not going to make progress on these things.
 - Let's focus on finding the best strategy for ND-GAR
- Think forward
 - Lots of things have happened. They're not going to be changed.
- Assume the current detector hall
 - *"The ND-GAR design will need to be adapted in such a way that it will not require further changes to the facility while retaining its physics capability."*
- Bear with questions/reviews/scrutiny:
 - In much of the discussion we are dealing with (perceived) risk
 - We may need to repackage existing information for different audiences
- Working with jargon
 - It's inevitable that we will have to deal with some esoteric terms (e.g. "CD1RR")
 - Avoid jargon when we can, and when unavoidable, explain it.
 - Likewise, if there is some term you don't know, ask for an explanation. No point in being confused.

PROPOSED DISCUSSION POINTS:

- Introductions
- Status of proto-consortium documents/discussions
 - Magnet conceptual design and costing status
 - ND-GAr-Lite design document
 - Funding strategy for detector components
- Timelines
- Deliverables/Goals
- Subgroups?
- Timelines/Next steps

TIMELINES

CP Violation Sensitivity



- HEP provided updated funding guidance, the “reference profile,” on 13 August.
- Project is currently implementing the reference profile, guided by the following sequencing, closely coordinated with DUNE collaboration leadership:

Anticipated Impacts Compared to Technically Limited Plan
Actual Impacts Being Finalized Now

1. Construct Far Detector 1 and Far Detector 2
 - Dependent on: FSCF construction and cryogenics infrastructure
 - Enables: start of science

0 to 3-month impact
Start science in 2nd FD in 2029
2. Construct Primary and Neutrino Beamline
 - Dependent on: NSCF Beamline Complex construction
 - Enables: start of oscillation physics

~24 to 36-month impact
Start operation in 2032
3. Construct Near Detector
 - Dependent on NSCF ND Complex construction
 - Enables: understanding of detector systematics for ultimate science objectives

Up to 48-month impact
Start operation in 2032

If reconciliation bill passes and provides resources for science infrastructure, anticipate technically limited schedule

- ND-GAr measurements becomes relevant ~200 kt-MW-yr, very important by ~400 kt-MW-yr
 - 200 kt-MW-yr =
 - ~8 years with 2 FD modules at 1.2 MW
 - ~4 years with 4 FD modules at 1.2 MW
- Need for ND-GAr ~2038 with start of beam in 2032
 - n.b. Roughly includes expected PIP-II/power ramp which may add ~2 years (4 years to reach 1.2 MW)

Adapted from C. Marshall

DELIVERABLES:

- Understanding of scope
 - Suggest a WBS to guide discussion and to provide a framework for scope, scheduling, etc.
- Cost estimate
 - Work towards as complete/formal basis of estimate for as many components as possible
- Risk analysis
 - All aspects (technical, cost, schedule, procurement, etc.)
- Resource model/matrix
 - What are the intended/targeted sources of funding
 - What are the timelines/cycles
- Schedule: accounting for
 - Technical development
 - Funding strategy
 - Physics needs of experiment

TIMELINES/OPTIONS WITH REGARD TO US PROCESS

- It is difficult/impossible to change the strategy going into CD1RR
 - The process is effectively “locking down” now
 - TMS will remain the muon spectrometer through CD1RR
- Possible paths:
 - Change spectrometer option after CD1RR in advance of CD2
 - Is ND-GAr-Lite the right path in this case?
 - Create a new “Phase 2” project (“MIE=Major Item of Equipment” in US speak)
 - Can/should we target “full” ND-GAr directly?
 - Or is there also a sensible “phasing” strategy here?
 - Does it allow us to bypass TMS? (i.e. can it come in soon enough)
 - Something else?

SUB-DISCUSSIONS?

- Magnet
 - Review of technical design
 - Risk
 - Design/Procurement strategy
- Detector components (Scintillator tracker, TPC, ECAL, muon systems)
- Resource model
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NEXT STEPS

Next Friday:

- Proposed meeting time of Friday 0800 CDT every other week, starting next week (8 October)
- Please read the two design documents
 - Start asking questions, commenting, etc.
- Formalize process/deliverables with spokespeople
- Formulate initial WBS
- Identify dates/members to review
 - Magnet technical design
 - Magnet procurement strategy
- Can we proceed to review the ND-GAR-Lite document?