

# ND-GAr Strategy Meeting

22 October 2021

# Agenda

- Updates (roundtable)
- EB meeting and follow-up developments
- Continued Development

(Slides posted as pdf after meeting)

# Executive Board Meeting:

- Presentations from
  - A. Bross: ND-GAr/SPY magnet design status
  - J. Raaf: ND-GAr-Lite status including installation schedules
  - Presentation also at DUNE collaboration call
- Other Discussions (e.g. with FNAL, DOE)
  - “Day 1 Detectors” = (HD+VD) + (ND-LAr + TMS + SAND + (DUNE-PRISM))
  - ND-GAr should be an MIE (Major Item of Equipment)
    - “Any additions to Day 1 will need to be in a separate (new) effort”
    - “Major detector upgrade projects will likely need to go through the next P5”
    - “Initiatives like ND-GAr need to be reviewed by PAC/LBNC”
- Follow up discussion . . . . .

# P5 + Snowmass:

- Major LBNF/DUNE “upgrades” are
  - outside of current LBNF/DUNE-US Project
  - to be considered by P5

Snowmass sets the path to P5

- Important to engage and make the case in each topical frontier in Neutrino Frontier (and beyond)
  - Three-flavor oscillations
  - Neutrino interactions
  - Beyond standard model
  - . . . . .
- Neutrino Frontier Report is in progress
  - ND-GAr is one of a few things that should be motivated
  - Unlike in most discussions, we should make a broad case
- “Scale of US effort should reflect community interest”
- Let’s make the best case we can

# NF Report Deadlines

These will be made official and posted on the wiki after any discussion at today’s meeting

- **Extended outline due (NF): Dec 18**
- **Report draft due (NF): Feb 28**
- **NF Workshop: March 16-18**
- **Preliminary Report due (NF): May 10**
- **Preliminary Report due (Snowmass): May 31**
- **Final Report due (NF): Sept 9**
- **Final Report due (Snowmass): Sept 30**

White papers before pause.

DUNE executive summary white paper restarting  
Physics need for FD 3,4 ND-GAr, 2.4 MW  
BSM text available -> 2nd BSM@ND detector

(Justo)?

Do we need specific ND-GAr WP? (Yes?)

Author/interest list (include non-DUNE)

Appoint POC for ND-GAr WP -> email to APB

Rough draft by end of december.

Guidance on physics need for ND-GAr: date

200-400 kt-MW-yr?

# LBNC and PAC

- “Initiatives like ND-GAr need to be reviewed by PAC/LBNC”
- The case for ND-GAr has been presented to LBNC
  - Includes approval/endorsement of the Conceptual Design Report
- Upcoming PAC meeting (16-19 November)
  - Includes ND-GAr presentation
    - Present physics case
    - Not details of “Phase 1”, staging/transitions, etc.
  - Separate submission from LBNC regarding its evaluation/recommendations
  - Charge to committee will be to evaluate physics case
- Let’s make the best case we can

# DEVELOPMENT PLAN

## ALICE HPgTPC Upgrade Structure (from Alan)

- WP1: GEM foils
- WP2: Inner Readout Chambers (IROC)
- WP3: Outer Readout Chambers (OROC)
- WP4: High-Voltage system (HV)
- WP5: Front-End Electronics (FEE)
- WP6: Readout system
- WP7: Installation and commissioning

- Work Packages/WBS:

- Magnet
- HPgTPC
- (Fast Timing/T0)
- ECAL
- Muon System
- (Calibration)
- (DAQ)
- (I&I)

- Refine names, write dictionary

- Create substructure as necessary

- (Re)-articulate from a technical standpoint :

- Physics case and requirements
- Alternatives analysis
  - Basic technology choices (HPGTPC vs. ???)
  - More detailed choices (Readout/detection methods)
- Necessary R&D, timelines, resources, and technical maturation plan
- Decisions/Milestones
- Relation to funding milestones

## SPHENIX structure (from Alan)

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POM02.1.02 TPC
POM02.1.02.01 TPC Mechanics
POM02.1.02.01.01 TPC v1 Field Cage Prototype
POM02.1.02.01.02 TPC v2 Field Cage
POM02.1.02.01.03 TPC Final Field Cage
POM02.1.02.01.04 TPC v1 Modules
POM02.1.02.01.04.01 TPC v1 Module Gas Enclosure
POM02.1.02.01.04.02 TPC v1 Module Common Mechanics
POM02.1.02.01.04.03 TPC v1a Module Prototype
POM02.1.02.01.04.04 TPC v1b Module Prototype
POM02.1.02.01.05 TPC v2 Modules
POM02.1.02.01.05.02 TPC v2 Module Common Mechanics
POM02.1.02.01.05.03 TPC v2a Module Prototype
POM02.1.02.01.06 TPC Production GEM Acquisition
POM02.1.02.01.07 TPC High Voltage System
POM02.1.02.01.08 TPC Assembly
POM02.1.02.02 TPC R1 Modules
POM02.1.02.02.01 TPC R1 Module Factory Preparation
POM02.1.02.02.02 TPC R1 Pre-Production Module
POM02.1.02.02.03 TPC R1 Module Production
POM02.1.02.02.04 TPC R1 Module Production Procure Contracted Labor and M&S
POM02.1.02.03 TPC R2 Modules
POM02.1.02.03.01 TPC R2 Module Factory Preparation
POM02.1.02.03.02 TPC R2 Pre-Production Module
POM02.1.02.03.03 TPC R2 Module Production
POM02.1.02.04 TPC R3 Modules
POM02.1.02.04.01 TPC R3 Module Factory Preparation
POM02.1.02.04.02 TPC R3 Pre-Production Module
POM02.1.02.04.03 TPC R3 Module Production
POM02.1.02.05 TPC FEE
POM02.1.02.05.01 TPC FEE Prototype v1
POM02.1.02.05.02 TPC FEE Prototype v2 (Pre-Production)
POM02.1.02.05.03 SAMPA chip 80 nsec
POM02.1.02.05.04 TPC FEE Production
POM02.1.02.06 TPC DAM
POM02.1.02.06.01 TPC DAM Evaluation - FELIX 1.5
POM02.1.02.06.02 TPC DAM Evaluation - FELIX 2.0
POM02.1.02.06.03 TPC DAM Production
POM02.1.02.07 TPC Support Systems
POM02.1.02.07.01 TPC Laser System
POM02.1.02.07.02 TPC Gas System
POM02.1.02.07.03 TPC Cooling System
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# ACTION ITEMS

- ND-GAr: Appoint POC for dedicated ND-GAr Snowmass WP who will contact:
  - APB to notify that white paper is being produced
  - Justo to coordinate with respect to overall ND BSM paper
  - Reach out to NF conveners/Topical conveners
- Preparations for PAC meeting
  - Coordination between ND-GAr, Physics Conveners, Spokespeople
- Consolidation of planning/scheduling, etc.
  - HAT: propose WP/WBS structure
  - Develop R&D/TM plan.
  - Alternatives analysis