Status of the Technical Design Report (TDR) for SAND in the ND complex

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SAND meeting

July 2, 2024

UNIVERSITÀ DEL SALENTO
L'Ateneo tra i due mari
INFN
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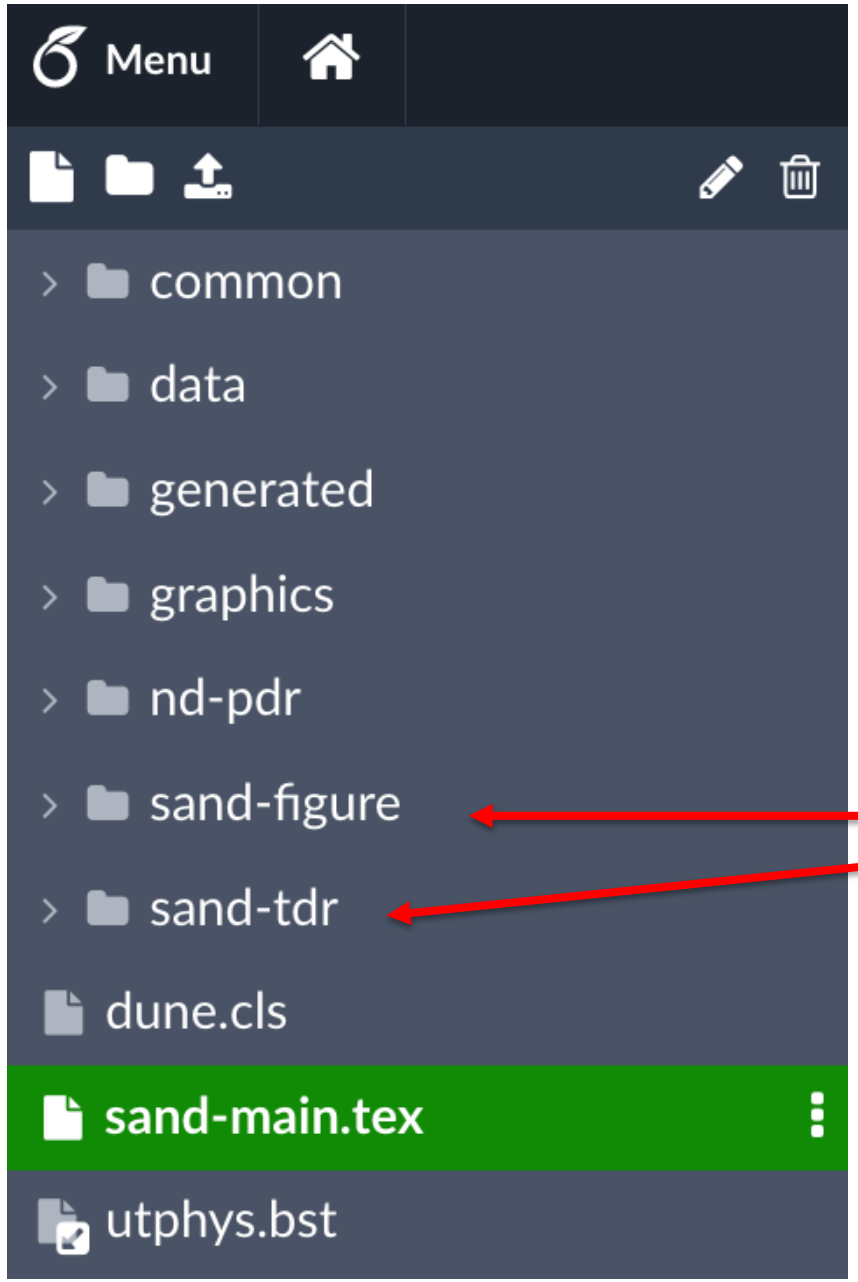


An overleaf is adopted according to

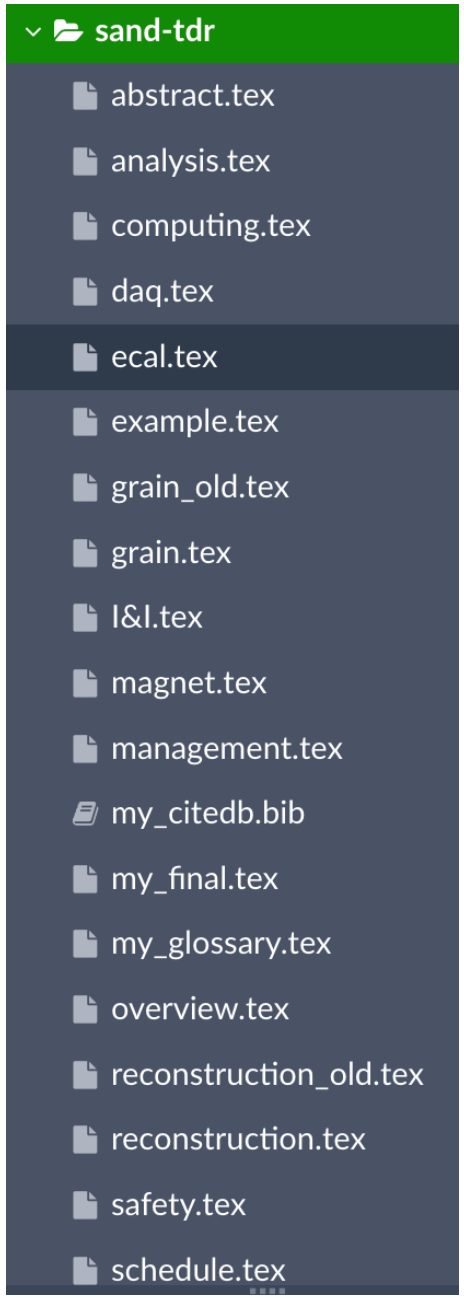
LATEX conventions for LBNF/DUNE documents

(shared with H.A. Tanaka and A.E. Heavey)

The figures in sand-figure and the files in sand-tdr

are input for sand-main.tex

Very simple to transfer text and figures
in the ND-TDR



Sections in the SAND chapter

1. Overview
2. Lead/Scintillating-Fiber Calorimeter (ECAL)
3. Superconducting Magnet
4. Liquid Argon Active Target (GRAIN)
5. Tracker
6. Data Acquisition (DAQ) Architecture
7. Detector Control (DCS)
8. Detector Safety System (DSS)
9. Software & Computing
10. Event Reconstruction
11. Analysis
12. Installation & Integration
13. Safety
14. Organization & Management
15. Time Schedule
16. Possible Upgrades

Glossary
References

New DUNE words and new references in evidence (at the file end)

Sections in the SAND chapter

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Plan

1. At least 2 authors for each section done
2. Index & key words for each section done
3. Data collection & write-up in progress
4. Internal reading & correction to be organized

Present number of pages 174

1.1 OVERVIEW pages 1-5

Present text extracted from the CDR

Update in progress according to the TASK-FORCE document (last DUNE general meeting)

1.2 CALORIMETER pages 7-27

Present text and figures about
- design & features
- performance
- chamber & barrel dismounting

To be completed
- electronics
- DAQ

To be written
- endcap dismounting
- revamping & test
- packaging & shipping
- activities @ FNAL
- schedule & milestones

1.3 MAGNET pages 28-42

Present text and figures about
- description & features
- coil dismounting
- revamping options

To be completed
- activities @ LNF
- power supply

To be written
- yoke dismounting
- packaging & shipping
- activities @ FNAL
- schedule & milestones

1.4 GRAIN pages 43-58

Present text and figures about
- matrix description
- lens description
- mechanics
- ASIC design

To be completed
- reconstruction

To be written
- simulation & results
- integration & installation
- schedule & milestones

Deadline in the Working Group

End of July

1.5 TRACKER pages 59-62

Present - some figures about STT geometry

1.6 DAQ
1.7 DCS
1.8 DSS pages 63-71

Present - DSS

To be completed - DAQ
- DCS

To be written - calibration

1.5 RECONSTRUCTION pages 73-123

Present

- GEANT & FLUKA
- single particle reconstruction (muon, neutron …)
- particle ID

To be written

- reconstruction with GRAIN
- event separation in the spill

From the document DUNE-doc-13262-v7 "A Proposal to Enhance the DUNE Near-Detector Complex"

1.8 ANALYSIS pages 124-157

Present
- selection of CC interactions
- ν-H interactions
- flux measurement

To be written
- on-axis beam monitoring
- external background
- ν-e scattering
- coherent π production
- $\nu_e/\nu_{\square}$ ratio

From the document DUNE-doc-13262-v7

"A Proposal to Enhance the DUNE Near-Detector Complex"

To be written

1.9	Computing
1.12	I & I
1.13	Safety
1.14	Management
1.15	Time Schedule
1.16	Possible Upgrades

July 2024 dead lines

Comm. Scient. I	SAND (ECAL+GRAIN+tracker)
DUNE/FNAL	ECAL+magnet

An increase of the write-up rate is expected in order to be ready within the deadlines

Expected Materials/Documents:

- Preliminary design report sections describing KLOE magnet and calorimeter, including any modifications, refurbishments, upgrades, and major auxiliary tooling/infrastructure.
- Schedule
- Any permitting needed
- Org charts, agreements relevant to defining roles, scope, and responsibilities