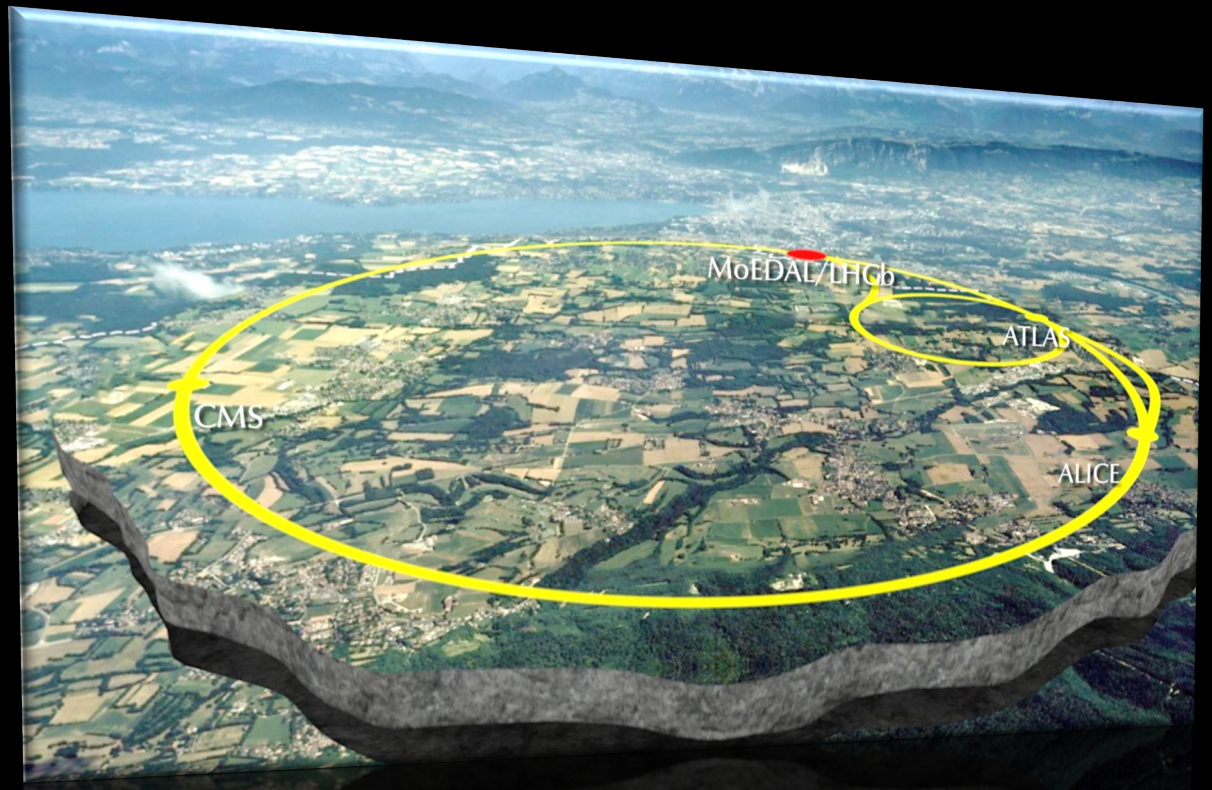
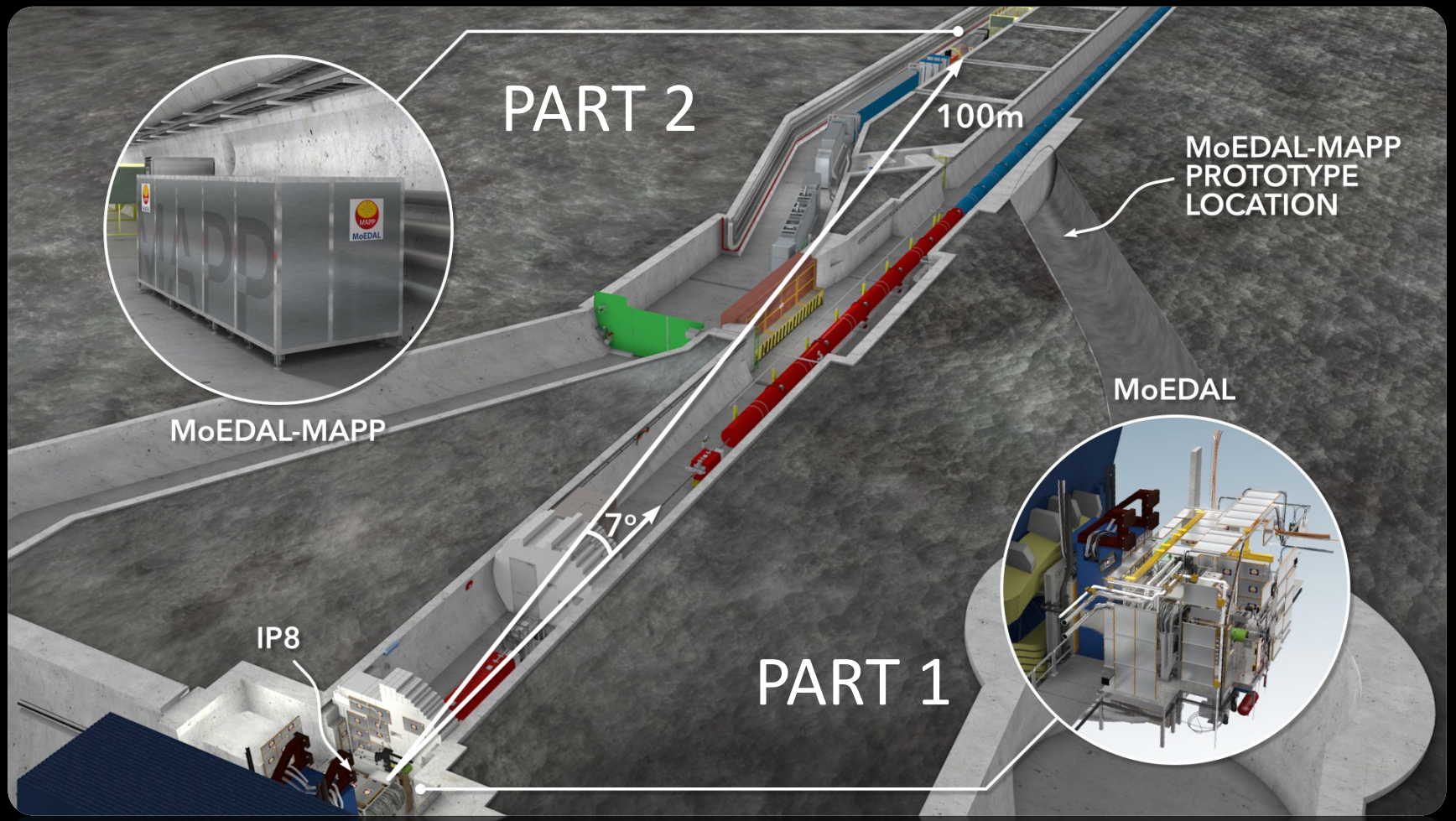
MoEDAL MAPP at LHC's Run-3 Installation - A Progress Report



Mitchel Baker, Paul Davis, James L. Pinfold, Richard Soluk
For the MoEDAL-MAPP Experiment

MENU

MAPP was approved by the CRB on December 1st 2021

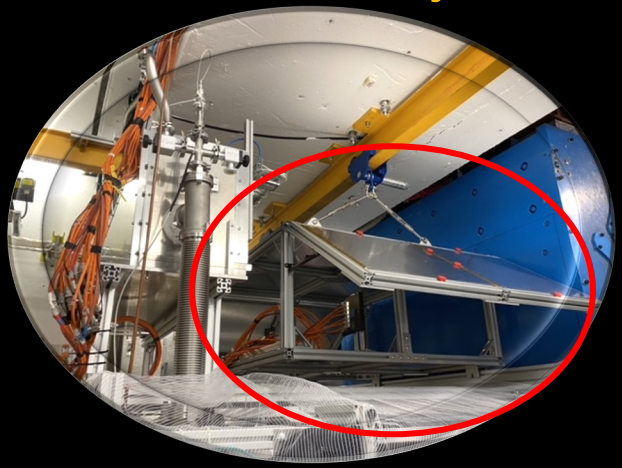


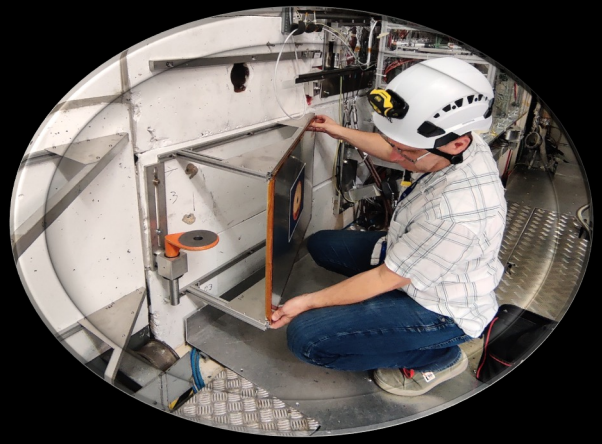
Upgraded MoEDAL Installed for Run-3

MoEDAL

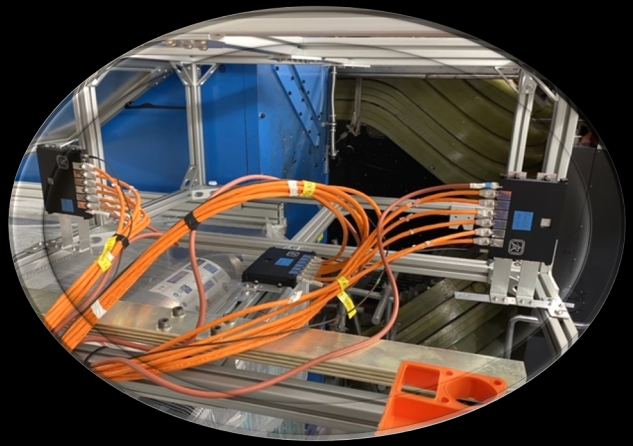
Upgrades to the Run-2 MoEDAL Detector, for Run-3 – completed in March 2023

VELO-TOP NTD array installed

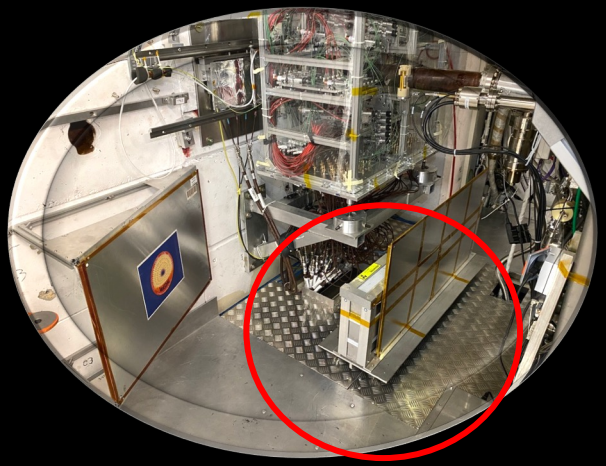




NTD Stacks Point to IP



TimePix3 Chips connected to LHC clock

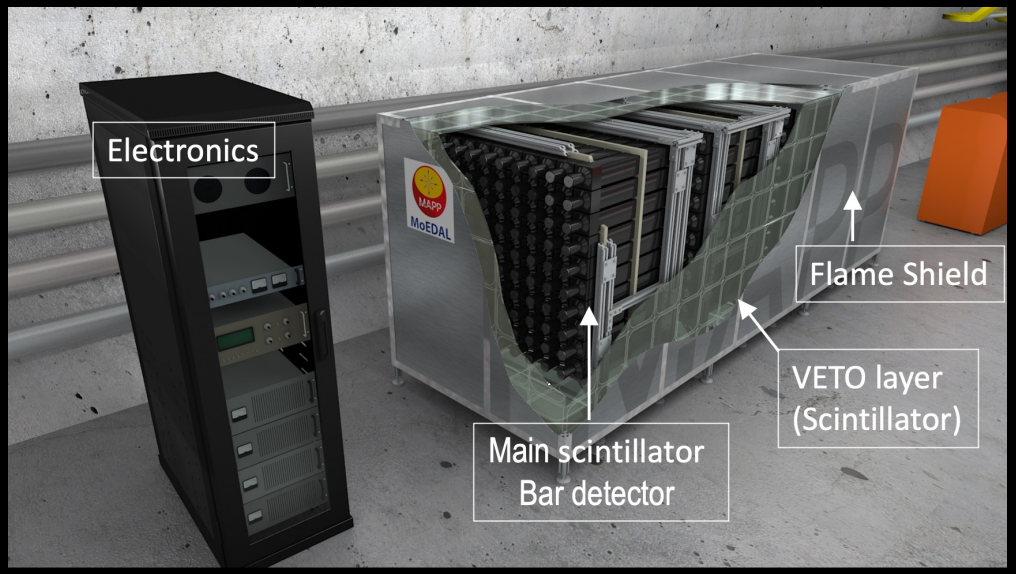


Forward MMT box reconfigured

MoEDAL Work for 2023 Technical Stops

- *MoEDAL's MMT detectors and the TPX detectors and the great majority NTD stacks were installed in March 2023. MoEDAL is now **taking data***
- ***WORK FOR TECHNICAL STOPS IN 2023***
  - *Due to last minute and unexpected restrictions on access a few NTD stack were not installed. These stacks will be installed in one day of the June Technical Stop (TS)*
  - *In the October TS all NTDs will be changed ready for the 2023 Heavy Ion Run.*

MAPP Installation



- *Status by UA83 closure on March 10th:*
  - *LV power supplies, feed-throughs and cables installed*
  - *Cockcroft-Walton HV board and PMTs placed on ~30 scintillator blocks*
  - *Top of flame shield framework installation completed*
  - *All detector support structures, and electronics rack installed.*
  - *Power, emergency off button, ethernet and fibre optic cables in place.*

MAPP-Work Completed Since March

- *Bases for the 100 PMTs (that were acquired late due to failure of HZ Photonics supplier) completed.*
- *Light guides for these PMTs completed and installed on 100 scintillator bars*
- *Cockroft-Walton HV units for all 400 PMTs now available*
- *Frontend ADC daughter boards completed*
- *Aluminium for flame shield as well as t-slot support structure for the flame shield acquired and cut to size.*
- *ISSUES:*
  - *The motherboard for the frontend readout is delayed however we are still just on track to receive boards for installation in June.*

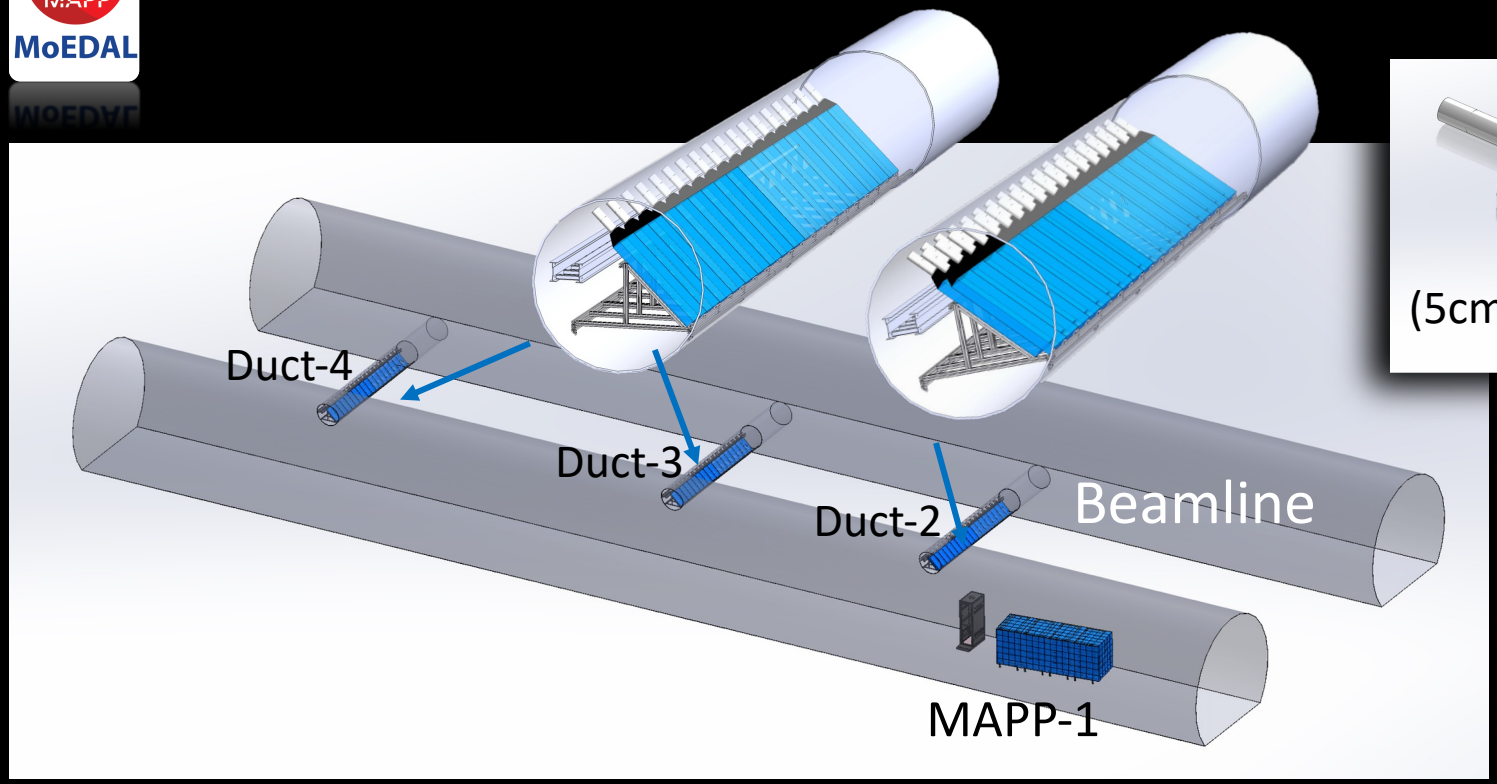
Planned for Technical Stops 2023

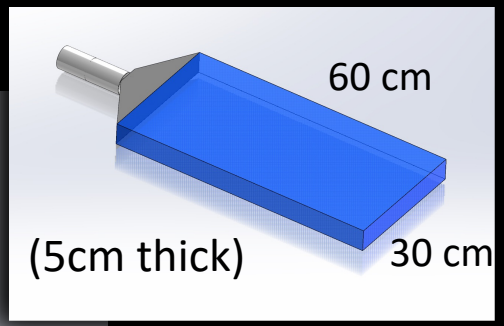
- ***PLANNED FOR JUNE 2024 TECHNICAL STOP***
  - *Install last 100 bars with light guides*
  - *Install flame shield*
  - *Fully instrument ~ 100 bars and include in the readout chain*
  - *Obtain cosmic ray signals from instrumented bars*

- ***PLANNED FOR 2-DAY NOVEMBER TECHNICAL STOP***
  - *Fully instrument ≥ 20 more bars and include in the readout chain*
  - *Install & test full readout chain to the external storage for ≥ 100 channels*

- ***YETS (Staring November 2023)*** *– Complete installation of MAPP-1.*

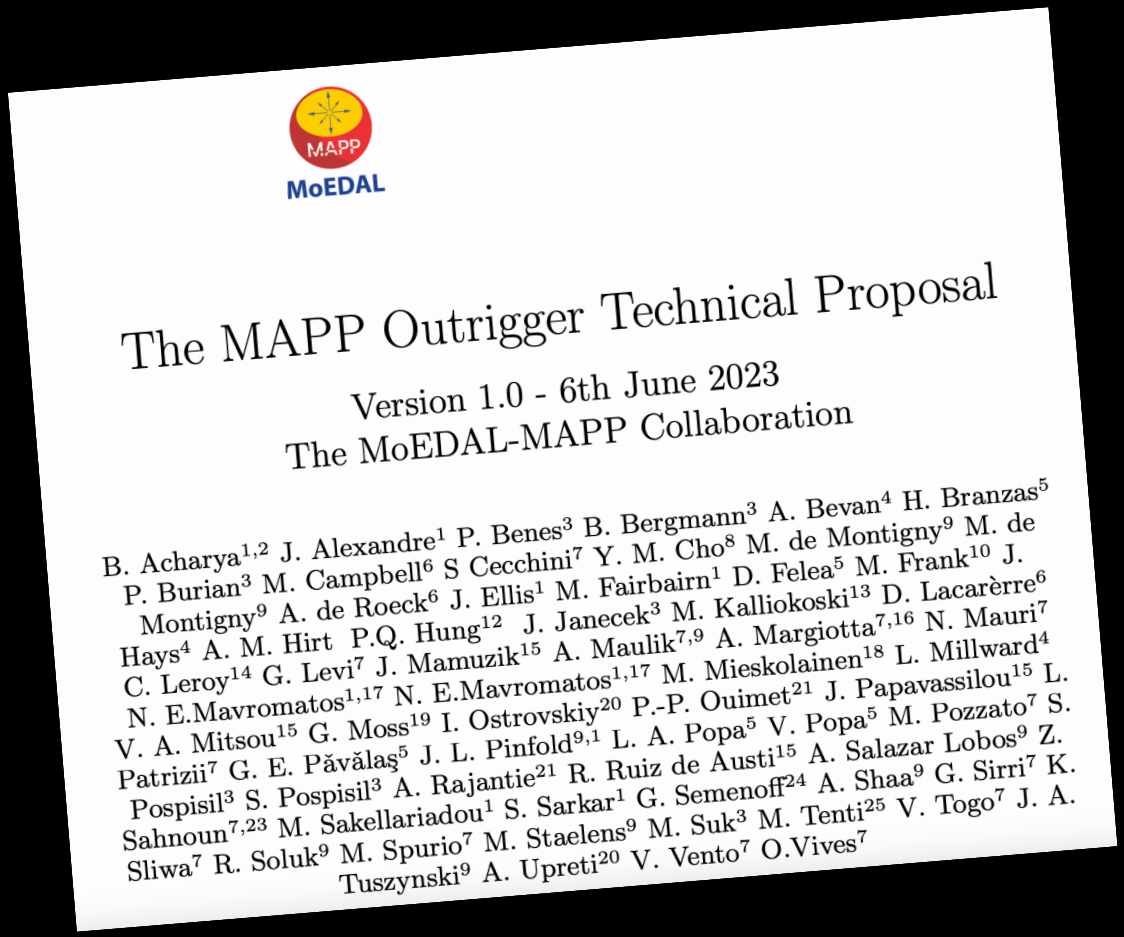
The MAPP-1 Outrigger





- *The first iteration of the MAPP-1 Outrigger Technical Proposal is ready for review. The purpose of this auxiliary detector is to improve acceptance for higher mass mCPs*
  - *All scintillator + PMTs required are in hand (scintillator needs to be cut to size)*
  - *Readout electronics & calibration tech. will be the same as for MAPP-1*
  - *We will utilize t-slot support structures for the Outrigger as we did for MAPP-1*
  - *All required funding is in place*

The MAPP-1 Outrigger Technical Report



The MAPP Outrigger Technical Proposal

Version 1.0 - 6th June 2023

The MoEDAL-MAPP Collaboration

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- *If approved the Outrigger Detector would be constructed in the summer and fall of 2023 and installed in January and February of 2024.*

Summary

- *MoEDAL Installation was essentially finished in March 2023 and MoEDAL is now taking data. The last several remaining NTD stacks will be installed in 1 day of the June 2023 TS.*
  - *Replace NTDs in October TS to be ready for the HE run.*
- *We envisage installing the following elements of the MAPP detector in the 4-5 day TS in June 2023:*
  - *The remaining 100 scintillator bars + lightguides;*
  - *The complete flame shield;*
  - *PMTs and complete frontend readout chain for ~100 bars connected to local test computer - Study test signal from instrumented bars.*
- *In the two day October 2023 TS we will: install the MAPP-1 readout computer + storage and initiate readout chain to external data store*
- *Completefull installation of MAPP-1 in the 2023 YETS.*
- *We are in the process of submitting the Outrigger Detector Technical Report with a view to install in January February of 2024.*