

WP2

"T2K Detector Upgrade and Neutrino Physics"

WP2 structure

- 2 main lines of activity, each subdivided in 2 tasks
 - T2K upgrade, aimed at optimized acceptance and better systematics: design and TDR, prototyping and testing, construction, integration
 - new "horizontal" TPCs
 - new "SuperFGD" high-granularity active target
 - additional T2K data taking and analysis with improved strategy and algorithms
 - cross sections
 - oscillation analysis

Tasks 2.1 and 2.2: Design, construction and integration of TPCs and SuperFGD

- TPC: design and production of
 - field-cages
 - MicroMegas readout and front-end electronics
 - Mechanical and assembly structures
 - Back-end electronics
- SuperFGD:
 - production and assembly of $\sim 2\text{M}$ scintillator cubes and readout fibers
 - Integration of MPPCs and electronics in very limited space
- Tight integration in already existing structure
- Close collaboration among all involved partners
 - Prototyping and construction in Europe
 - Final assembly at J-Parc
- → see next talk by Thorsten Lux

Tasks 2.3 and 2.4: cross-sections and oscillation analysis

- Cross-section measurements
 - as model-independent as possible
 - exploiting higher statistics and selection criteria for improved acceptance
- Oscillation analysis
 - new reconstruction and selection algorithms
 - additional signal event channels
 - optimized fiducial volume
- Cross-section data is also valuable for a broader community, including theorists
- → see next talk by Sara Bolognesi

Recall of WP2 milestones and deliverables

- Task 2.1 and 2.2
 - EMD 12: Deliverable: Technical Design Report of the upgraded ND280
 - EMD 24: Milestone: production and test of first prototypes with front-end electronics
 - EMD 48: Deliverable: report paper on the new detectors
- Task 2.3
 - Milestones: EMD 24: improved selection acceptance for cross-section measurements, EMD 36: Neutrino energy reconstruction using detectors at different off-axis angles
 - Deliverables: EMD 48: report on cross-sections on C and O and reduction of uncertainties, EMD48: report on electron neutrino cross-section and reduction of uncertainties
- Task 2.4
 - EMD 24: Milestone: inclusion of multi-ring topologies in the event selection
 - EMD 48: Deliverable: report on CP sensitivity