

IdeaSquare
The innovation space at CERN

Generic pre-R&D at IdeaSquare

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ISAB Meeting
June 27th, 2024

Developments in 2023-2024

Activities (I)

Continue hosting the development of high-performance electronics and detectors

- Development of a new generations of detectors and related electronics for the LHC-phase 2 upgrade, the dark matter particle searches and for the next generation colliders
- Detector prototype design and test
- Chip design and bench-test
- Development of a new type of low power neuromorphic analog electronics, capable to support ns-level inference and correlation on large and sparse data sets, for a new approach to green computing.

Applications: large area fast tracking systems

- ATLAS HL-LHC upgrade
- New dark matter experiment searches, based on enclosing large monitored volumes to search for rare events
- New applications based on the cosmic rays background exploitation:
- Muon tomography for home land security, large infrastructures integrity, geological prospections, cultural heritage searches
- Future colliders....

Developments in 2023-2024

Activities (II)

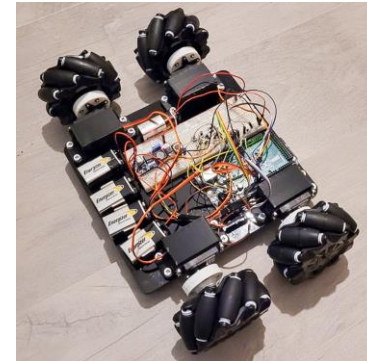
Continuing hosting developments for:

- WA105-ICARUS Cosmic Ray Tagger System
- Feasibility study of power-over-fiber technology
- T2K SuperFGD
- Testing photosensors for Neutrino project
- Testing 3D printed plastic scintillators
- Testing Hyper Kamiokande electronics



Continuing hosting developments for CMS Inspection Robot

- WA105-ICARUS Cosmic Ray Tagger System
- Feasibility study of power-over-fiber technology
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Future Developments Pipeline

Part of the Quantum Technology Initiative at CERN.

Hosting summer school on Quantum Sensing at CERN (Michael Dose, <https://doser.web.cern.ch/> , 2-6 September).

The six quantum sensing families that form part of the ECFA detector R&D roadmap are:

- clocks and clock networks
- kinetic detectors
- superconducting and spin-based sensors
- optomechanical sensors
- atoms, ions, molecules and atom interferometry
- metamaterials, 0-,1-,2-dimensional materials

IdeaSquare at the disposal of the Quantum Sensing community for becoming a hosting facility (ongoing discussions).

Clocks and clock networks 5.3.1

Kinetic detectors 5.3.2

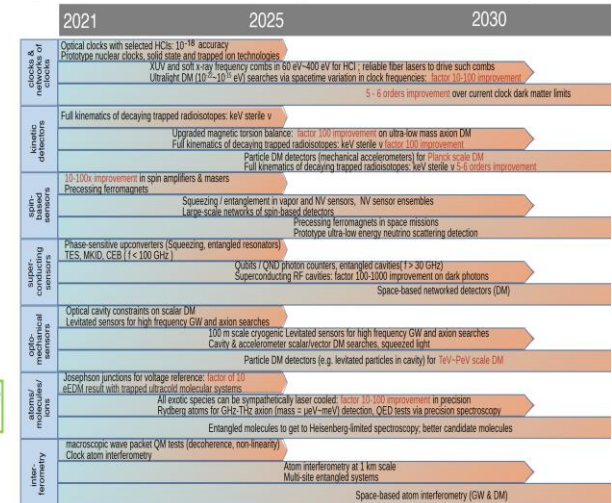
Spin-based sensors 5.3.3
Superconducting sensors 5.3.3

Optomechanical sensors 5.3.4

Atoms/molecules/ions 5.3.5
Atom interferometry 5.3.5

Metamaterials, 0/1/2D-materials 5.3.6
Quantum materials 5.3.6

also for HEP!





Thank You