AIDA innova

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Timeline

Project start date	**1 April 2021**
Kick off meeting	**April 12-16, 2021,** Travel eligible for reimbursement
Pre-financing 1st installment	May-June 2021
First Annual Meeting	March 2022
Year 1 report	due end May 2022
Pre-financing 2nd	July-August 2022
P1 report	due end November 2022
P1 payment	January 2023
P2 report	due end May 2024
Project end date	31 March 2025
P3 report	due end May 2025

Aida program

	Key R&D issues	WPs related to activity
Facilities	**Test Beam and Irradiation Infrastructure** High precision telescopes, DAQ integration, tools for irradiation, characterisation and electromagnetic compatibility test facilities.	WP3, WP4
Detectors	**Silicon-based Vertex and Track Detectors** High spatial resolution, high rate/occupancy capability, fast/precise timing, radiation hardness, low mass, 4D tracking.	WP5, WP6
	Large area, large volume Gaseous Detectors Large area muon systems, low cost, spatial resolution, fast timing, high rate capability, radiation tolerance, high-pressure gaseous TPCs.	WP7
	Calorimetry High granularity, radiation hardness, large scale, excellent hit timing, Particle Flow, dual-readout capability, 5D imaging.	WP8
	Cryogenic neutrino detectors Very large volume cryogenic systems, dual-phase operation and read-out, radio-purity, cryogenic photodetectors, high photodetection efficiency.	WP9
Enabling technologies	**Advanced Electronics, Mechanics and Common Computing Frameworks and Tools** Ultra-light Structures and new materials, micro-channel cooling, novel CMOS technologies, high performance ASICs, common frameworks, algorithms, machine learning.	WP10, WP11, WP12
	Prospective R&D Generic, so-called "Blue Sky" R&D, exploring new technologies.	WP13

Eco gas is a sub-task of WP 7 task 7.2

Objectives
Task 7.1. Coordination and Communication *See introductory section on page 29.* **Task 7.2. Multigap RPCs (MRPCs) for fast timing and Eco-friendly gas mixtures for RPCs** • Developing and testing material (thin plates of low resistivity glass) • Construction, characterisation and test beam of small-size prototypes • Construction of 1×1 m^2 prototypes with the new readout plane structure for a semi-digital hadron calorimeter (SDHCAL) • Test beam study of the shower time development in an SDHCAL, equipped with the prototype detectors • Identification and characterisation of new gas mixture candidates • Validation of the gas mixtures after large integrated doses at GIF++ **Task 7.3. Development of resistive electrodes for MPGDs and Industrial engineering of high-rate μ-RWELL detector** • Production of Diamond Like Carbon (DLC) with ion beam deposition and pulsed laser deposition • Study of the resistance of graphene to polyimide etching liquids • Characterisation of 10×10 cm^2 foils by DLC and graphene • Industrial production of small-size prototypes and their characterisation • Industrial production of large-size prototypes (~ 0.5 m^2) and their characterisation **Task 7.4. A 4-channel electronic board prototype for cluster counting and Hybrid readout for high pressure gas TPC for neutrino physics** • Design electronics and realise a 4-channel prototype for cluster counting in ultra-light drift chambers • Identification and characterisation of adequate gasses • Construction of a small-scale TPC prototype (~10 l) with a hybrid charge and optical readout **Task 7.5. Photon detectors for hadron particle identification at high momenta** • Development of MPGD single photon detectors for compact Ring Imaging Cherenkov detectors • Comparison of measured prototype characteristics with Silicon Photomultipliers (SiPMs) and Large Area Picosecond Photodetectors (LAPPDs)

Relations with EcoGas@GIF++ collaboration

- Beneficiaries are CERN and INFN (LNF)
- More INFN sections are involved
- The plan is to use the budget received for
  - Upgrade of gas mixer at GIF
  - 1 year AR for work on GIF++ activities and analysis