

DRD1 Work Package 6



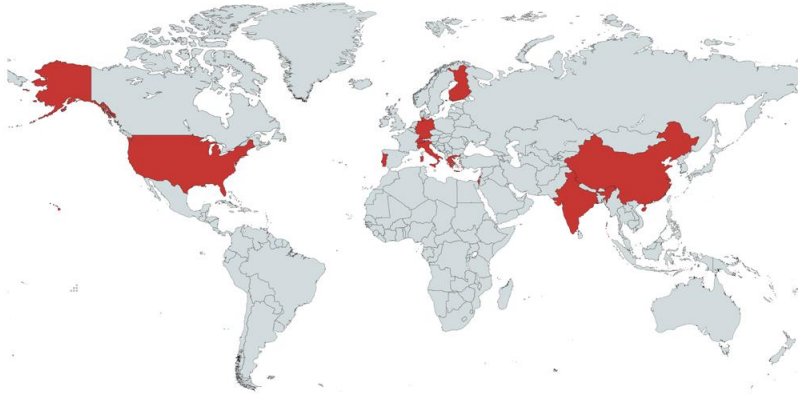
Shuddha Dasgupta, Fulvio Tassarotto

December 9th, 2024

WP6 participants

WP 6 – 9 Countries

China, Finland, Germany, Greece, Israel, Italy, Portugal, Switzerland, USA



Meeting on October 4th, 2023

Meeting on June 12th, 2024

Country	Collaborating Institution	Town	Institution Code	Contact
China	University of Science and Technology of China	Hefei	CN-USTC	Jianbei Liu
Finland	Helsinki Institute of Physics	Helsinki	FI-HIP	Francisco Garcia Fuentes
Germany	TUM School of Natural Sciences Technische Universität München	Munich	DE-NAT-TUM	Laura Fabbietti
Greece	Aristotle University of Thessaloniki	Thessaloniki	GR-GSRI.AUTH	Dimitrios Sampsonidis
India	National Institute of Science Education and Research, Bhubaneswar	Bhubaneswar	IN- NISER	Shuddha Shankar Dasgupta
Israel	Weizmann Institute of Science	Rehovot	IL-WIS	Shikma Bressler
Italy	INFN Sezione di Padova	Padova	IT-INFN.PD	Gianmaria Collazuol
Italy	INFN Sezione di Trieste	Trieste	IT-INFN.TS	Fulvio Tessarotto
Portugal	University of Aveiro	Aveiro	PT-UA	Joao Veloso
Switzerland	European Organization for Nuclear Research	Geneva	CH-CERN	Eraldo Oliveri
USA	Facility for Rare Isotope Beams, Michigan State University	East Lansing	US-FRIB-MSU	Marco Cortesi

WP6 Tasks

Task ID	Task	Performance Goal
T1	New robust UV photoconverters for gaseous photon detectors	Robustness against accumulated charge dose: < 20% deterioration of quantum efficiency for 100 mC/cm ²
T2	Increase photon detection efficiency	Photoelectron efficiency in gas $\geq 75\%$ of that under vacuum
T3	Suppression of ion feedback to the photocathode, increase of stability and longevity	Stable detector operation at gain of 10^5 . IBF reduction down to 10^{-4} Stable operation in harsh environment (10^{11} neq/cm ²)
T4	Gaseous photon detectors sensitive to visible light	Sustained photosensitivity to visible light in gaseous photon detectors
T5	Spatial resolution and readout granularity	Spatial resolution ≤ 1 mm
T6	Time resolution	Time resolution ≤ 100 ps
T7	Modelling and simulation of gaseous photon detectors	Accurate simulation of IBF to the photocathode, gain and stability
T8	Large area coverage	Gain and QE variation $\leq 10\%$ over 1 m ² area with $\leq 10\%$ dead area.
T9	Readout electronics for single photon signals	New frontend ASIC chip with 64 channels, ENC 0.5 fC at 20pF

WP6 deliverable 1 and milestones

Milestones and Deliverables	Description	Start Date	End Date
M6.1.1	Design and production of Double Micromegas photon detector [T3]	0	12M
M6.1.2	Test of small-size prototypes [T2, T5] and new readout development, with low noise at low input capacitance [T9].	0	24M
D6.1	Demonstrator prototypes for: <ul style="list-style-type: none"> - Large area Micromegas - Double Micromegas [T8] - New ASIC chip prototype integration 	0	36M

WP6 deliverable 2 and milestones

Milestones and Deliverables		Description	Start Date	End Date
M6.2.1		Design and production of small-size photon detector prototype consisting of THGEM + Micromegas equipped with hydrogenated nanodiamond photocathode [T1] PICOSEC Micromegas equipped with innovative photocathodes [T6]	0	12M
M6.2.2		Results of simulations and measurements of IBF suppression [T7,T3], photocathode robustness [T1]	0	24M
D6.2		Reports on: <ul style="list-style-type: none"> - novel robust photocathode performance [T1] - PDE achievements [T2] - test bench for visible sensitive photocathodes studies [T4] 	0	36M

WP6: Next steps

WP6 participants meeting January/February 2025

Confirmation of the activity program, milestones, deliverables

Agreement on plan towards endorsement procedure

Contact with funding agencies

Start of endorsement procedure