

NCSR “Demokritos”



Institute of Nuclear and Particle Physics

Christos Markou

10/6/2022

Scientific Identity, our Mission

INPP is a unique research Institute in Greece in the fields of Nuclear and Particle Physics.

INPP is a, predominantly, **fundamental research institution**, with activities focused on the areas of **High Energy Particle Physics (HEP)**, **Nuclear Physics (NP)** and **Astroparticle Physics (APP)**, with experimental and theoretical activities in these main research areas.

The main mission of INPP is to carry out world class experimental and theoretical research, achieve and retain scientific excellence and support innovation in High Energy Physics, Nuclear Physics and Astroparticle Physics as well as their applications .

Personnel

18 Permanent/tenure track researchers

6 Staff scientists and technicians

2 Administrative personnel

1 Support personnel

8 research associates

31 Ph.D. candidates

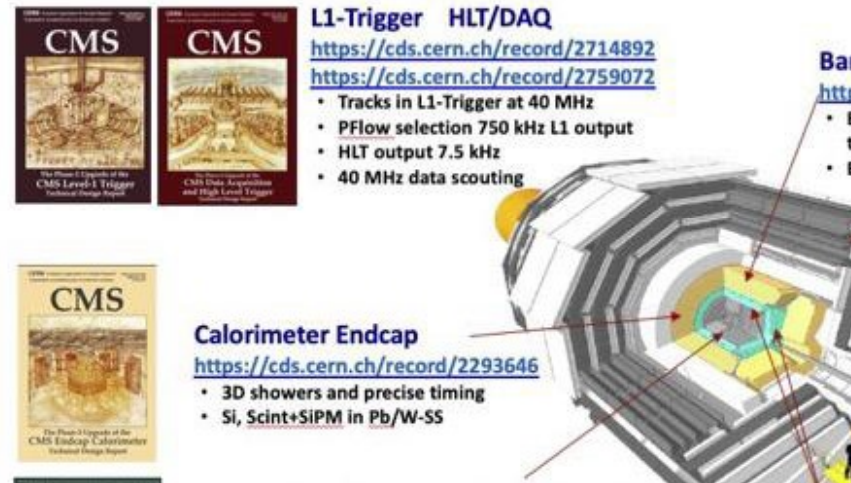
29 Master and Undergraduate students

Experimental High Energy Physics – CMS

Part of the CMS in LHC since the inception of the experiment in the 1990s.

Development of the Si modules of the CMS Preshower of ECAL calorimeter, the global CMS trigger emulator project and numerous physics analyses.

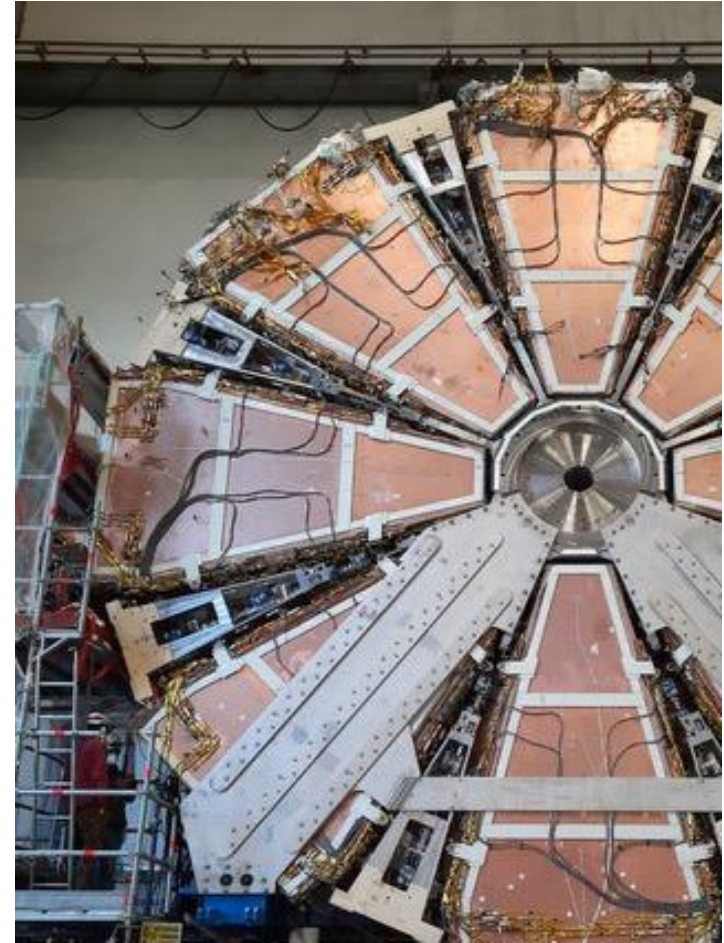
Since 2016, part of the Tracker Silicon project in view of the Phase II upgrade of the CMS detector: development of the silicon sensors, the Data Acquisition System and the evaluation of the front-end electronics.



Experimental High Energy Physics – ATLAS

Contribution to the upgrade of the ATLAS detector, and in particular the **New Small Wheel (NSW) end-cap muon detector**.

Heavy involvement in the construction of **electronics for the Trigger and the DAQ**, the **installation of the detector** and substantial responsibilities related to **Muon software Coordination** and the **sTGC Trigger Commissioning coordination**.



Theoretical High Energy Physics

A very broad set of research topics ranging from [Quantum Field Theory](#), to [Scattering amplitudes](#) and [Particle Physics Phenomenology](#), [String theory](#) and [Quantum Gravity](#), [Non-Linear Chaotic Dynamics](#) and [Complex systems](#), [Cosmology](#) and [Quantum Computation and information theory](#).

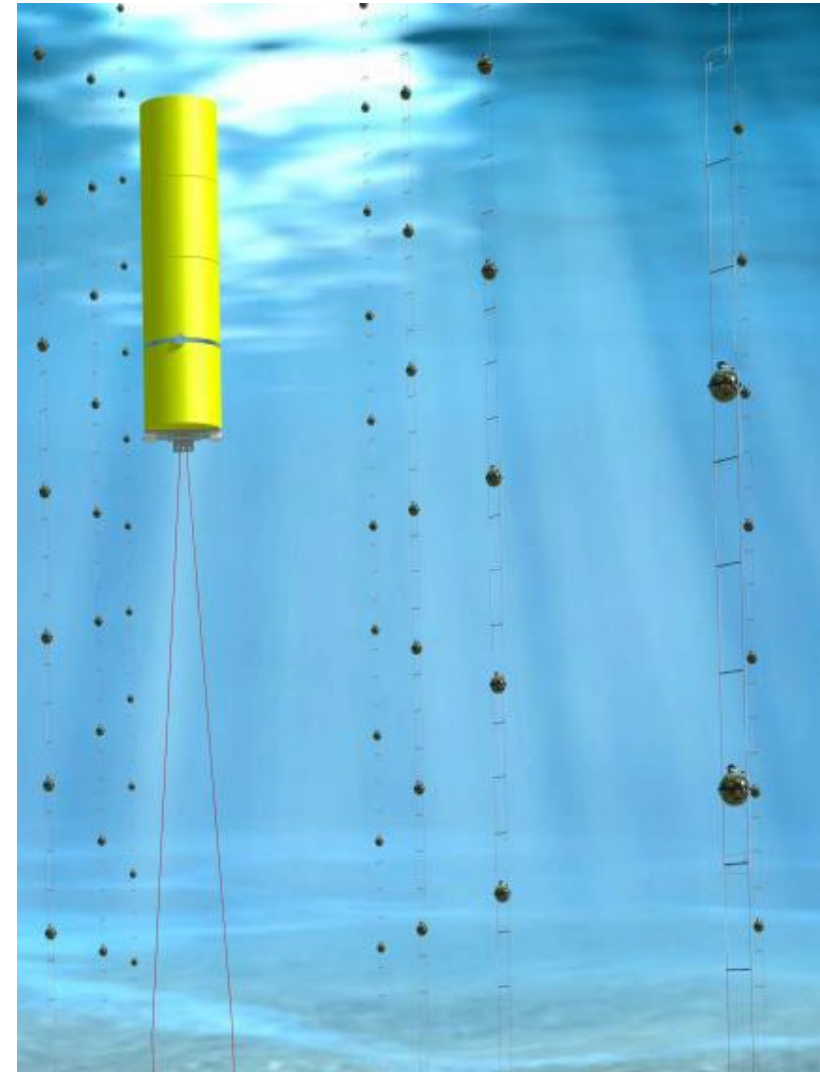
Strong ties with the our experimentalists.



Astroparticle Physics

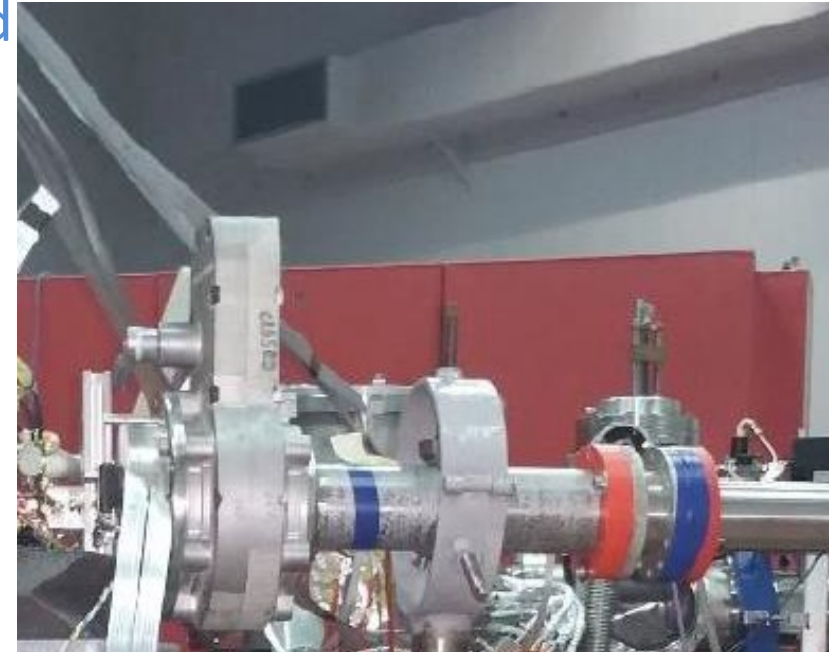
The group is part of the [KM3NeT](#) collaboration building a network of [underwater neutrino telescopes](#) in the Mediterranean Sea.

[Development, construction, testing and validation of detector components, data collection and data analysis.](#) The INPP hosts a lab of [assembly, testing and calibration of Digital Optical Modules.](#) Active program for the development of [novel neutrino detection techniques,](#) and synergies with [geo-and marine scientists](#) and expansion of the experimental program.



Nuclear Physics and Applications

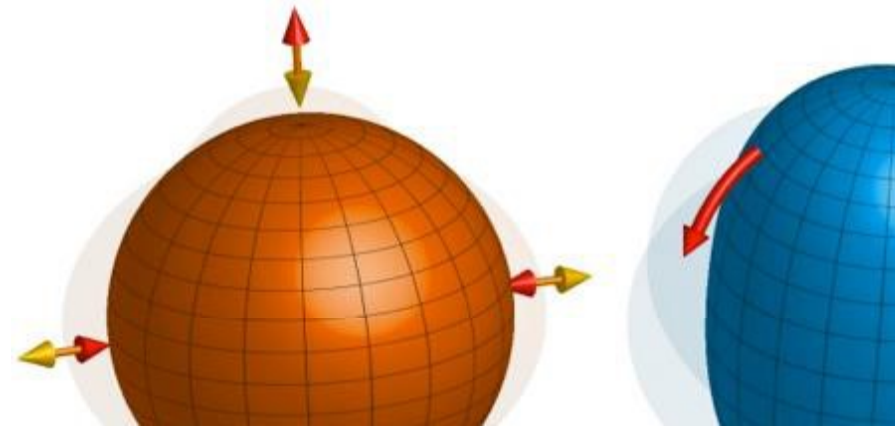
Experimental studies on [nuclear astrophysics](#) and [nuclear structure](#), interactions of [ion beams](#) and [X-rays with matter](#). Key infrastructure are the [Tandem Accelerator \(TAL\)](#) and [XRF Laboratory](#). Interdisciplinary applications with interest in [emerging technologies](#), [cultural heritage](#), [environmental monitoring](#), [human health](#), etc. The XRF lab provides technology transfer and on-site analytical services at [museums](#), [archaeological sites](#), etc. Joint research with national and European collaborators. TAL undergoes a major upgrade under the CALIBRA project.



Theoretical Nuclear Physics

Focusing on the study of nuclear structure, the Nuclear Theory Group achieved a breakthrough in 2017 with the introduction of the [proxy-SU\(3\) symmetry](#), for calculating the properties of medium mass and heavy Nuclei away from closed shells.

The proxy-SU(3) symmetry has recently produced [important, parameter-independent](#) predictions on the occurrence of [shape coexistence](#) and has triggered experimental proposals for its verification



More information can be found on our web site

www.inp.demokritos.gr

and

www.inp.demokritos.gr/education