Ultra-Fast Silicon Detectors: Enabling Discoveries

Fact Sheet

Project Information

UFSD
Grant agreement ID: 669529
Project website
Status
Ongoing project
Start date
1 September 2015
End date
31 August 2021
Funded under
H2020-EU.1.1.
Overall budget
€ 1 793 312,50
EU contribution
€ 1 793 312,50
Hosted by
ISTITUTO NAZIONALE DI FISICA NUCLEARE
Italy

Objective

The goal of our project is to empower a broad range of research fields with a completely new particle detector, able to concurrently deliver time resolutions of the order of ~10 picoseconds and position resolutions of ~30 microns.

In so doing, we will remove the constraints that many applications such as particle tracking, medical PET, mass spectroscopy, and beam monitoring have due to the lack of precise information on all 4 dimensions.

Our analysis of state-of-the-art particle detectors has shown a dichotomy: specialized sensors measure very accurately either time or position, but not both: the ambitious goal of UFSD is to create a new family of detectors, based on controlled charge multiplication in silicon, which will remove this limitation. We will have to tackle significant challenges along this research path, but our simulations and prototypes indicate that this approach has the potentiality to radically transform present...
Our ultimate goal -- a highly segmented detector with a space resolution of ~30 microns and a time resolution of ~10 picoseconds -- can be achieved only by developing full custom Very Large Scale Integrated chips that, matching the size of the read-out to the area of each pixel sensor, will deliver unprecedented timing resolution at the pixel level.

The PI, N. Cartiglia, is well known in the field of particle physics and detector development. He is currently in charge of several projects involving both new directions in physics, among which the LPCC forward physics group and the CT-PPS project at CERN, as well as new developments in instrumentation. He will lead the project leveraging on his past experience in detector development and group/grant management, his knowledge of the silicon research foundries and laboratories, and the expertise available in his home institution (INFN, Torino, Italy).

Field of science
/natural sciences/chemical sciences/analytical chemistry/spectroscopy
/natural sciences/chemical sciences/inorganic chemistry/inorganic compounds

Programme(s)

Topic(s)

Call for proposal
ERC-2014-ADG

Funding Scheme
ERC-ADG - Advanced Grant

Host institution

ISTITUTO NAZIONALE DI FISICA NUCLEARE
Address
Vi E i F i54
Activity type
Research
EU contribution
€174331250
Beneficiaries (2)

ISTITUTO NAZIONALE DI FISICA NUCLEARE

Italy

EU contribution

€ 1 743 312,50

Address

Activity type

Research Organisations

Via Enrico Fermi 54
00044 Frascati

Website

Contact the organisation

UNIVERSITA DEGLI STUDI DEL PIEMONTE ORIENTALE AMEDEO AVOGADRO

Italy

EU contribution

€ 50 000

Address

Activity type

Duomo 6
13100 Vercelli

Higher or Secondary Education Establishments

Website

Contact the organisation

Last update: 18 March 2020
Record number: 197332

Permalink: https://cordis.europa.eu/project/id/669529/

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