An innovative Cylindrical Gas Electron Multiplier Inner Tracker for the BESIII Spectrometer

Fact Sheet

Project Information

BESIIICGEM
Grant agreement ID: 645664

Funded under
H2020-EU.1.3.3.

Project website

Overall budget
€ 1 498 500

Status
Closed project

EU contribution
€ 1 498 500

Start date
1 January 2015

End date
31 December 2018

Coordinated by

ISTITUTO NAZIONALE DI FISICA NUCLEARE

Italy

Objective

Inner Trackers (IT) are key detectors in Particle Physics experiments; excellent spatial resolution, radiation transparency and hardness, and operability under high occupancies are main requirements. While planar Gas Electron Multiplier (GEM) detectors are common in modern spectrometers, only one Cylindrical-GEMs (CGEM) detector has been produced up to now by the KLOE2 Collaboration and is being commissioned.

We aim to design, build and commission by 2017 a CGEM detector candidate to be the new IT of the BESIII spectrometer, hosted on BEPC2 in IHEP, Beijing; BESIII data taking will last until at least 2020. The IT itself will represent an evolution w.r.t. the state of the art of GEM (and CGEM) detectors, since the use of new kind of supports for the GEM foils will reduce the total radiation length of the detector and improve its tracking performance; an innovative design of the CGEM anode will allow
tor smaller capacitance and hence for bigger signals. The relatively strong BESIII magnetic field requires a new analogue readout; full custom front-end electronics, including a dedicated ASIC, will be designed and produced for optimal data collection. Specific software will be developed to first simulate, and then reconstruct the CGEM hits to detect reaction products. Proper benchmark channels will be identified and investigated to maximise the outcome of the project. An existing cloud infrastructure hosting a virtualised grid Tier-2 will be further expanded, providing an advanced environment optimised for scientific computing, suitable to investigate specific tools beyond commercial standards as well. The project could significantly enhance the already established interaction between the participating EU and Chinese Institutions in BESIII, strengthening in particular those technological aspects remained so far in the background of the cooperation, and providing clear deliverables as the CGEM IT, the secondments being the key to knowledge transfer within the network.

Field of science
/natural sciences/computer and information sciences/computational science

Programme(s)

Topic(s)

Call for proposal

H2020-MSCA-RISE-2014

Funding Scheme

MSCA-RISE - Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE)

Coordinator

ISTITUTO NAZIONALE DI FISICA NUCLEARE

Address
Via Enrico Fermi 54
00044 Frascati
Italy

Activity type
Research Organisations

EU contribution
€ 657 000
### Participants (2)

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Country</th>
<th>EU contribution</th>
<th>Address</th>
<th>Activity type</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHANNES GUTENBERG-UNIVERSITAT MAINZ</td>
<td>Germany</td>
<td>€ 670 500</td>
<td>Saarstrasse 21, 55122 Mainz</td>
<td>Higher or Secondary Education Establishments</td>
</tr>
<tr>
<td>UPPSALA UNIVERSITET</td>
<td>Sweden</td>
<td>€ 171 000</td>
<td>Von Kraemers Alle 4, 751 05 Uppsala</td>
<td>Higher or Secondary Education Establishments</td>
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### Partners (1)

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<tr>
<td>INSTITUTE OF HIGH ENERGY PHYSICS CHINESE ACADEMY OF SCIENCES</td>
<td>China</td>
<td>Yuquan Road 19B, 100049 Beijing</td>
<td>Research Organisations</td>
</tr>
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**Last update:** 3 July 2017  
**Record number:** 194354