

Press release

Science – Particle physics

CSEM signs cooperation agreement with CERN

Neuchâtel/Geneva, 22 May 2013 – CSEM and CERN are joining forces to pursue and strengthen scientific and technical cooperation between the two organisations in the field of high energy physics with a view to improving the performance of CERN’s new particle accelerator – the Large Hadron Collider (LHC).

Combining CERN’s scientific know-how with CSEM’s technological expertise, the aim of the cooperation is to develop silicon microstructures for cooling the surfaces of particle tracking detectors. Standard cooling systems in particle physics generally suffer complications linked to the difference in thermal expansion coefficients between the various components – a difference that can result in irreversible damage such as cracks or breaks. Temperature control is therefore a major challenge in efforts to prevent aging or premature deterioration of the detectors and their electronic components.

CERN, known worldwide for its fundamental research in the field of particle physics, has already developed a microchannel cooling technology that permits better temperature control on particle detectors. CSEM, meanwhile, has undisputed expertise in the area of microsystems technology, covering the various aspects of microfabrication, assembly and encapsulation. The alliance between the two organisations therefore holds a lot of promise for the future.

Silicon on silicon for better detector performance

The proposed solution consists of an ultra-thin silicon plate made up of a myriad of microchannels through which a fluid is pumped under pressure. This plate is placed in direct contact with the silicon surface of the components to be cooled, namely the detectors and associated electronic chips. These reliable, ultra-thin and high-performance silicon devices meet the requirements of detector technology perfectly in terms of volume and weight. As a result, the devices can be positioned as close as possible to the LHC beam while minimising the disruption to the particles produced by collisions.

In addition to this development, the technological innovations created through the cooperation will help perfect new cooling devices that are smaller, more compact, more precise and adapted to the three-dimensional electronic systems (3D encapsulation) of the future.



The ALICE – A Large Ion Collider Experiment – experiment at the CERN LHC / © CERN

Additional information

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About CERN

CERN

CERN, the European Organization for Nuclear Research, is the world's leading laboratory for particle physics. It has its headquarters in Geneva. At present, its member states are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. Romania is a candidate for accession. Israel and Serbia are associate members in the pre-stage to membership. India, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and UNESCO have observer status.

More information about CERN

- Fact sheet 2012, press.web.cern.ch/facts-and-figures/factsheet-2012

- General brochure, <http://cds.cern.ch/record/1278456?ln=en>

About CSEM

CSEM – a center of innovation

CSEM SA is a private research and development institution specializing in microtechnologies, nanotechnologies, microelectronics, system engineering, and information and communication technologies. A true trailblazer in its industry, it has supported the creation of numerous startups, thus also boosting the dynamism of the Swiss economic landscape. CSEM has almost 400 highly qualified employees distributed among its offices in Neuchâtel, Zurich, Muttenz, Alpnach and Landquart.

To find out more, go to www.csem.ch

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