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Schweiz

Your indication:

Your correspondence of:

My indication:

Date:

131410-gs

24.03.2014

BGV Collaboration Agreement

Dear Dr. Bordry,

Attached to this letter you find one copy of the signed collaboration agreement for the BGV demonstrator. The second copy is on its way to EPFL, the third we kept for our records.

We are looking forward to collaborating with CERN and EPFL and to building this important detector for LHC diagnostics.

Yours sincerely,



Dr. Georg Schwering
Head of Administration

**COLLABORATION AGREEMENT
FOR THE DESIGN, DEVELOPMENT, INSTALLATION AND COMMISSIONING
OF A DEMONSTRATOR BEAM-GAS VERTEX DETECTOR FOR THE LARGE
HADRON COLLIDER (LHC)**

**REFERENCE KN2286
(THE "AGREEMENT")**

BETWEEN: THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH ("CERN"), an Intergovernmental Organization having its seat in Geneva, Switzerland, duly represented by Frédérick Bordry, Director of Accelerators and Technology,

AND: THE I. PHYSIKALISCHES INSTITUT B RWTH AACHEN ("RWTH"), established in Aachen, Germany duly represented by Prof. Dr. Stefan Schael, Head of RWTH,

AND: THE ECOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE ("EPFL"), having its registered address at Bâtiment CE 3316 Station 1, 1015 Lausanne, Switzerland, duly represented by Prof. Dr. Aurelio Bay, Director of the EPFL Laboratoire de Physique des Hautes Energies (LPHE),

Hereinafter "Party" and collectively "Parties",

CONSIDERING THAT:

CERN, an Intergovernmental Organization, is a leading global laboratory in particle physics, providing for collaboration of a pure scientific and fundamental character, with participation by scientific institutes from all over the world;

RWTH is a leading institute in the fabrication of high quality scintillating fiber tracking detectors;

EPFL has the required expertise in the fabrication of tracking detector and associated high-speed readout electronics boards;

The mutual benefit that the Parties would derive from collaboration between them;

The Parties have decided to establish a collaboration to design, develop, install and commission a demonstrator BGV system for the LHC, subject to the terms of the Agreement;

AGREE AS FOLLOWS:

**Article 1
Purpose**

1.1 Under the terms of this Agreement, the Parties shall collaborate in the design, development, installation and commissioning of a demonstrator Beam-Gas Vertex detector for the LHC (the "Project"). The Parties shall use the results of their collaboration for non-military purposes only.

- 1.2 Except if the Parties agree otherwise, each Party shall bear the cost of its participation in the Project.

Article 2
Parties' contributions

- 2.1 Annex 1 sets out the details of the Project, the scope of each Party's contribution, including the required resources of the activities and any deliverables, milestones, the management of the Project and other relevant information.

Article 3
Technical co-ordination and contact persons

- 3.1 The overall responsibility of the Project lies with CERN, it being understood however that RWTH and EPFL shall remain exclusively responsible for the proper performance of their activities.
- 3.2 The Parties shall each nominate a technical co-ordinator, who together shall coordinate the technical execution of this Agreement, as well as contact persons, as set out in Annex 1.

Article 4
Experts

- 4.1 Each Party shall ensure the selection of experts with the necessary skills and competence to execute the Project on its behalf, and shall ensure that its experts comply with the rules of conduct and safety in force at the host Party.
- 4.2 Where CERN acts as a host Party in the execution of the Project, the RWTH and EPFL experts may be appointed as associated members of the personnel pursuant to the conditions set out in the CERN Staff Rules and Regulations from which it follows that, for the entire duration of the association of the RWTH and EPFL experts with CERN (i) the RWTH and EPFL experts shall have a legal link with RWTH and EPFL respectively, (ii) RWTH and EPFL shall be responsible for the social insurance of their respective experts, (iii) the RWTH and EPFL experts shall maintain medical insurance cover adequate in Switzerland and France for themselves and accompanying family members, which shall include cover for occupational illness and accidents for the RWTH and EPFL experts, and (iv) the RWTH and EPFL experts shall have adequate financial resources to support themselves and accompanying family members. RWTH and EPFL shall hold CERN free and harmless from liability in connection with the subject matter of this Article.

Article 5
Conduct and safety

- 5.1. The experts shall comply with the rules of conduct and safety in force at the host Party.
- 5.2 Any equipment or other item contributed by a Party to the collaboration shall conform to the safety rules in force at the host Party where it will be installed and operated.

Article 6
Intellectual Property

- 6.1 The disclosure of information under this Agreement does not create any proprietary right for the receiving Party or Parties.
- 6.2 Title in intellectual property developed by a Party in the execution of this Agreement shall be vested in that Party, who shall grant the other Parties a free, non-exclusive license for the use of such intellectual property in the execution of its scientific programme by itself or through its partners and contractors, and for commercial exploitation.
- 6.3 Where intellectual property is developed jointly by the Parties and title is therefore vested in them jointly, they shall grant each other a free, non-exclusive license for the use of such intellectual property in the execution of their scientific programmes by themselves or through their partners and contractors, and for commercial exploitation.
- 6.4 The providing Party provides no warranty in respect of intellectual property made available by it under this Agreement, and the receiving Party or Parties shall hold it free and harmless from any liability arising from its or their use (including, as the case may be, by its or their partners and contractors) of such intellectual property.

Article 7
Publications

- 7.1 The Parties shall strive to jointly publish the results of the Project as Open Access publications.
- 7.2 In so far as the Parties do not jointly publish the results of the Project, publications by one Party involving results developed by the other Party or Parties shall be subject to the latter's prior written approval, which shall not be withheld unreasonably.
- 7.3 Publications shall acknowledge the Project between the Parties including, whenever appropriate, the experts having taken part in the development of the results covered by the publication.

Article 8
Liability

- 8.1 Except as provided in Articles 4.2, 6.4, 9.2, each Party shall bear its own loss and damage in connection with this Agreement.

Article 9
Entry into force, duration and termination

- 9.1 This Agreement shall enter into force on the date of signature by the last Party to sign. It shall remain in force for as long as necessary to give effect to its provisions.

9.2 In case of a substantial breach by a Party, the Party or Parties affected by the breach may withdraw from this Agreement if no corrective action satisfactory to the other Party or Parties is taken within one (1) month of the issue of a letter of notice by the other Party or Parties to the breaching Party.

9.3 Articles 4.2, 6, 8 and 10 of this Agreement shall continue to be in effect in respect of any activities undertaken prior to withdrawal from or termination of the Agreement, howsoever caused.

Article 10
Governing law and dispute resolution

10.1 The terms of this Agreement shall be interpreted in accordance with their true meaning and effect and as a consequence of CERN's status as an Intergovernmental Organization, independently of national and local law. Provided that if and insofar as this Agreement does not expressly stipulate, or any of its terms is ambiguous or unclear, then in those circumstances only and not in respect of this Agreement as a whole, reference shall be made to Swiss substantive law.

10.2 The Parties shall settle any difference concerning this Agreement amicably. Where this is not possible, the Parties shall resort to arbitration in accordance with a procedure to be specified by the Parties. Notwithstanding reference of the dispute to arbitration, the Parties shall continue to perform their obligations under this Agreement.

Article 11
Amendments

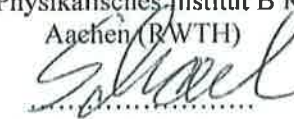
Any amendment to this Agreement shall be made in writing and signed by the authorized representatives of the Parties.

Signed on 24 March 2014

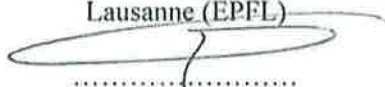
The European Organization for Nuclear
Research (CERN)


.....
Dr. Frédéric Bordry

The I. Physikalisches Institut B RWTH
Aachen (RWTH)


.....
Prof. Dr. Stefan Schael

The Ecole Polytechnique Fédérale de
Lausanne (EPFL)


.....
Prof. Dr. Aurelio Bay

ANNEX 1: Activities and acceptance procedure(s)

Technical coordinators:

EPFL: Dr. Guido Haefeli
RWTH: Dr. Thomas Kirn
CERN PH-LHCb: Dr. Massimiliano Ferro-Luzzi
CERN BE-BI-BL: Dr. Bernd Dehning

The demonstrator BGV system will be installed on LHC ring 2, at Point 4. All components that cannot be installed during a short LHC winter stop must be installed during Long Shutdown 1 (LS1), in 2013-2014. The goal is to have a commissioned demonstrator BGV system before the end of 2015. This collaboration agreement defines the task sharing and deliverables of the parties involved.

The utilization of a Beam-Gas Vertexing (BGV) system at the LHC has been proposed to measure accurately the LHC transverse beam sizes. This non-intrusive method has been demonstrated during the LHC Run 1 (2009-2013) by the LHCb experiment, where it was used to perform precise luminosity calibration experiments using beam-gas imaging.

The BGV system is composed of the following subsystems: a gas target, a tracking detector, a detector cooling system, a level-0 trigger system (with custom-made electronics) and a high-level trigger/data-acquisition system (based on commercially available electronics boards).

- The BGV is ultimately a beam diagnostics device. Therefore, the CERN beam instrumentation group (BE-BI) takes leadership in the BGV activity and long-term commitment for operating and maintaining the demonstrator BGV system until the end of LHC Run 2.
- The CERN Beams department (BE-BI) takes responsibility for the infrastructure, which includes the mechanical support of the detectors, detector cooling system and the high-level trigger/DAQ hardware (network switches, cables, multi-core CPU boxes, storage disks, etc.).
- With support from the vacuum group of the CERN Technology department (TE-VSC), BE-BI takes responsibility for the gas target, which includes the vacuum system, impedance management, gas injection system, and associated monitoring/control electronics, power supplies and cables.
- RWTH takes responsibility for the scintillating fiber modules of the tracking detector (photo detectors and readout excluded).
- EPFL takes responsibility for the silicon photomultipliers and associated readout electronics, cables and power supplies. The readout will be based on spare LHCb/VELO electronics (Beetle chips, analog driver boards, ARX digitizer boards, TELL1 boards, etc.). If spare LHCb parts of the readout system are lacking and need to be purchased, BE shall fund the procurement of new parts.
- The LHCb team of the CERN Physics department (PH-LHCb) takes responsibility for the level-0 trigger and fast control system with all associated cables and power supplies. This will be based on spare LHCb/VELO electronics boards (ODIN readout supervisor, TTCex, VELO Control board, ECS mezzanines, SPECS control boards, etc.). PH-LHCb also delivers the crates for the level-0 trigger system and readout electronics. If spare LHCb parts are lacking and need to be purchased, BE shall fund the procurement of new parts.
- BE-BI takes responsibility for the level-0 trigger detector (scintillator array) with associated readout electronics, cables and power supplies.

- BE-BI is providing the manpower for integrating, deploying and commissioning the BGV, for the simulation tasks and the implementation of the online event processing software. The supervision will be given by the collaborating Parties, if needed.
- BE-BI is responsible for the control/monitoring software. If needed, expert consultancy or supervision will be provided by the collaborating Parties.

Unless otherwise specified, taking the responsibility implies designing, developing, procuring, installing and commissioning.