

**SCIENTIFIC AND TECHNICAL COOPERATION**

**Nuclear Physics Experiments**

**Protocol I Between the  
UNITED STATES OF AMERICA  
and the EUROPEAN ORGANIZATION FOR  
NUCLEAR RESEARCH**

**To Agreement of May 7, 2015**

Signed at Geneva December 18, 2015



NOTE BY THE DEPARTMENT OF STATE

Pursuant to Public Law 89—497, approved July 8, 1966  
(80 Stat. 271; 1 U.S.C. 113)—

“ . . .the Treaties and Other International Acts Series issued under the authority of the Secretary of State shall be competent evidence . . . of the treaties, international agreements other than treaties, and proclamations by the President of such treaties and international agreements other than treaties, as the case may be, therein contained, in all the courts of law and equity and of maritime jurisdiction, and in all the tribunals and public offices of the United States, and of the several States, without any further proof or authentication thereof.”

**EUROPEAN ORGANIZATION FOR  
NUCLEAR RESEARCH**

**Scientific and Technical Cooperation:  
Nuclear Physics Experiments**

*Protocol I to agreement of May 7, 2015.  
Signed at Geneva December 18, 2015;  
Entered into force December 18, 2015.*

**NUCLEAR PHYSICS EXPERIMENTS PROTOCOL I**

**between**

**THE DEPARTMENT OF ENERGY  
OF THE UNITED STATES OF AMERICA (DOE)**

**and**

**THE EUROPEAN ORGANIZATION  
FOR NUCLEAR RESEARCH (CERN)**

**to**

**THE CO-OPERATION AGREEMENT**

**concerning**

**SCIENTIFIC AND TECHNICAL CO-OPERATION  
IN NUCLEAR AND PARTICLE PHYSICS**

**2015**

The Department of Energy of the United States of America ("DOE"),

and

The European Organization for Nuclear Research ("CERN"), an Intergovernmental Organization having its seat at Geneva, Switzerland,

(hereafter collectively referred to as "the Parties"):

### **CONSIDERING:**

That the Parties collaborated to their mutual benefit under the International Co-Operation Agreement Concerning Scientific and Technical Co-Operation on Large Hadron Collider (LHC) Activities signed December 8, 1997;

That the Parties successfully collaborated in the design, fabrication, and/or operation of major detector facilities at the LHC, under an Experiments Protocol I signed December 19, 1997;

That the Parties renewed their collaboration under the Co-Operation Agreement Concerning Scientific and Technical Co-Operation in Nuclear and Particle Physics signed May 7, 2015 (hereinafter the "2015 Co-Operation Agreement");

That United States universities and national laboratories play an important role in the ongoing exploitation of heavy ion physics with the ALICE, ATLAS and CMS detectors;

That at the same time the participation of U.S. scientists benefits the CERN program by providing intellectual and financial resources that allow substantial improvement in the capabilities of the detectors, and therefore a greatly enhanced research program in heavy ion physics and nuclear science;

That the excellent experimental results obtained so far strongly support continued cooperation in heavy ion physics at the LHC; and

That it is in the mutual interest of the Parties to continue and extend their cooperation on the LHC experiments' research in heavy ion physics, under this Nuclear Physics Experiments Protocol I (hereinafter "Protocol"),

## **HAVE AGREED AS FOLLOWS:**

### **Article 1 Purpose**

The purpose of this Protocol is to define the framework under which DOE, as the U.S. funding agency, and its national laboratories and grantees (hereinafter collectively referred to as the "U.S. Participants"), shall participate in the heavy ion physics programs in ALICE, ATLAS and CMS detector collaborations under the auspices of CERN (hereinafter the "Collaborations"). These activities will include increasing the physics reach of one or more of the detectors to the benefit of the LHC experiment(s) through construction of technologically advanced detectors in order to take full advantage of increases in the LHC accelerator's luminosity for heavy ions. The resulting increase in capabilities will facilitate and support the continued participation of the United States nuclear physics community in the heavy ion physics program at the LHC.

### **Article 2 Participation by U.S. Institutions in the Collaborations**

Each Collaboration shall maintain a process, as defined in a Memorandum of Understanding, for admitting participating institutions which shall apply equally to both CERN Member States and non-Member States. DOE national laboratories and grantees of DOE, including partnering universities, shall be entitled to participate in the Collaborations in accordance with applicable Memoranda of Understanding.

### **Article 3**

#### **Organization of U.S. Participants in the Collaborations**

The U.S. Participants in each Collaboration shall form an organization (hereinafter "U.S. Collaboration Organization") to co-ordinate within the framework of the overall Collaboration of which they are an integral part. Each U.S. Collaboration Organization shall designate a national contact to represent the U.S. Collaboration Organization within its respective international Collaboration, and shall establish its own Project Management Plan, which will describe the U.S. Collaboration Organization and distribution of management responsibilities. The national contacts shall represent the U.S. Collaboration Organizations before DOE, and be responsible to the Collaborations for U.S. technical and budget-planning activities in nuclear physics.

### **Article 4**

#### **CERN LHC Resources Review Boards**

The CERN LHC Resources Review Boards for the Collaborations, composed of representatives of each participating funding agency, shall monitor and oversee resource-related matters concerning implementation of this Protocol. DOE shall be a full member of these LHC Resources Review Boards.

### **Article 5**

#### **Memoranda of Understanding**

The responsibilities of the U.S. Collaboration Organizations for the research and development (R&D), engineering design, and prototyping and fabrication of any detector upgrades at the LHC shall be specified in Memoranda of Understanding ("MOUs"), one per experiment, with the concurrence of the CERN LHC Resources Review Boards. Subsystem Technical Design Reports on the scientific and technical aspects of the

detectors shall be submitted by the Collaborations to CERN for approval and shall be the basis for the commitments specified in the MOUs. Each MOU shall cover the actual construction of the relevant detector and its installation in the underground experimental area, and shall include the distribution of tasks and other responsibilities for all participating institutions, including those from the United States, as well as the organizational, managerial, and financial guidelines to be followed by each Collaboration.

## **Article 6**

### **Responsibilities of U.S. Participants in the Collaborations**

- 6.1 The U.S. Participants shall have responsibilities for R&D, engineering design, prototyping, fabrication, and normal maintenance and operation of any detector upgrades, including their subsystems and components, as agreed to and described in the MOUs developed pursuant to Article 5 of this Protocol and their addenda.
- 6.2 The U.S. Participants shall provide specified equipment to be built by or under the supervision of U.S. institutions for any agreed upon detector upgrades. They shall also contribute, in whole or in part, to the provision of items of a largely industrial nature considered as part of common projects which are the responsibility of a Collaboration (hereafter "Common Projects"). Such items shall be funded directly or indirectly by all participants in each Collaboration, in accordance with the provisions of the MOUs, and their provision shall be subject to the approval of the CERN LHC Resources Review Boards.
- 6.3 Requirements for cash contributions from U.S. Participants in the Collaborations, including contributions to "Common Funds" for costs associated with Common Projects, shall be specified in the MOUs. Responsibility for such contributions shall be in accordance with Article 7 below, and shall be limited to the amounts stated in the MOUs, except by mutual agreement among CERN, the Collaborations, and DOE.

## **Article 7**

### **Funding of U.S. Participation in the Collaborations**

- 7.1 The U.S. Participants may contribute their expertise and resources to the detector research, development and construction phases of any detector upgrades, as related to heavy ion performance and capabilities. Subject to availability of appropriated funds, DOE's total contributions to the LHC detector upgrades shall be specified and incorporated under separate implementing arrangements in the form of Addenda to this Protocol, and shall also be detailed in provisions of the MOUs concerned. The application of any funds specified in these Addenda to the detector system costs will follow standard DOE accounting practices.
- 7.2 Detector system cost estimates presented to and reviewed by CERN will utilize CERN accounting policies and practices. DOE will assume no responsibility with respect to the validity of such cost estimates for the U.S. Participants' contributions.
- 7.3 Funds provided by U.S. Participants under this Protocol for any detector upgrades shall only be used for those U.S. responsibilities identified in Article 6 above and the associated MOUs.

## **Article 8**

### **Responsibilities of CERN**

- 8.1 The general obligations of CERN as host laboratory, and of the participating institutions, are specified in the document "General Conditions Applicable to Experiments at CERN", which is hereby incorporated by reference and considered a part of this Protocol. The Financial Guidelines for LHC Collaborations (CERN/FC/3796 and CERN/FC/3796/Rev.; original dated September 14, 1995, revised September 4, 1998) is also considered a part of this Protocol.
- 8.2 The Parties understand that the design, fabrication, and operation of the detectors shall be managed by the Collaborations, respectively, with CERN having oversight responsibilities and providing

continuous monitoring through CERN's Research Board and its LHC Experiments Committee. The Research Board is responsible for CERN's entire experimental research program and is chaired by the Director-General, whereas the LHC Experiments Committee reviews for the Research Board the scientific and technical progress of the LHC experiments, and reports to the Research Board.

- 8.3 The Technical Co-ordinators of the Collaborations shall be CERN staff members, and shall have overall responsibilities for technical aspects of detector construction. Their responsibilities shall include integration of the subdetectors, safety, infrastructure at CERN, surface and experimental areas, services, installation, machine interface, and test beams.
- 8.4 Similarly, the Resource Co-ordinators of the Collaborations shall be CERN staff members, and shall have the responsibility for monitoring the financial aspects of the detector projects, including budget and resource planning and the MOUs, as well as the responsibility for the financial aspects of the Common Projects and associated Common Funds.
- 8.5 CERN shall have the responsibility to approve the appointments of the Technical and Resource Co-ordinators, and to ensure that they have the staff and engineering support required to carry out their responsibilities. It shall be CERN's overall responsibility to use reasonable efforts to ensure that there is a satisfactory match between the available resources (including funding and manpower) and the approved detector projects. CERN, through the Resource and Technical Co-ordinators, shall have oversight responsibility for Common Projects and Common Funds.

## **Article 9**

### **CERN Support for U.S. Scientists**

CERN shall provide to U.S. scientists participating in the Collaborations on behalf of U.S. Participants the same level of facility support that it normally provides to all its visiting scientists.

## **Article 10**

### **Entry into Force, Duration, and Termination**

This Protocol shall enter into force upon signature by both Parties. This Protocol shall remain in force for an initial period of five years and shall thereafter be renewed automatically, each time for a new period of five years, unless a written notice of termination is given by one Party to the other Party, or the Parties have agreed on its renewal by another period, at least six months prior to the renewal date, so long as the 2015 Co-Operation Agreement remains in force.

## **Article 11**

### **Amendment**

The Parties may amend this Protocol at any time by mutual written consent, so long as the 2015 Co-Operation Agreement remains in force. Implementing arrangements in the form of Addenda to this Protocol, which shall be subject to formal review by the Government of the United States and by CERN, are the preferred vehicles for legally-binding alterations or additions.

## **Article 12**

### **Final Provisions**

- 12.1 Each Party's participation in the activities contemplated by this Protocol is subject to the availability of appropriated funds, personnel, and other resources.

12.2 This Protocol is subject to and governed by the terms of the 2015 Co-Operation Agreement.

DONE at Geneva, Switzerland, in duplicate in the English language, on 18 December 2015

**FOR THE DEPARTMENT  
OF ENERGY OF THE UNITED  
STATES OF AMERICA:**

**FOR THE EUROPEAN  
ORGANIZATION FOR NUCLEAR  
RESEARCH:**

  
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Pamela Hamamoto

Rolf Heuer

Permanent Representative of the  
United States of America to the  
United Nations and Other  
International Organizations in  
Geneva

Director-General