



## **Cooperation Agreement for providing a framework for the testing and performance studies of photosensors**

12 October 2017

### **Preamble**

#### **Considering that:**

various Institutions and industrial partners, have expressed their interest in carrying out together a *long-term detector R&D for future ultimate photosensor*, which also includes an educational and technology training component.

These activities, referred to as **SENSE Cooperation Agreement**, comprise detector testing and prototyping, electronics design, computer simulations, end-user need analysis and more, are to be performed in the partner laboratories and at the CERN IdeaSquare testing facility on SiPM.

These experimental activities aim at exploring new detector technologies for physics experiments and industrial applications, while engaging students from different fields and school levels and industrial partners.

If the SENSE-Cooperation Programme proves successful, it may result in a formal proposal for a larger-scale follow-up program which will be regulated elsewhere.

Depending on the case, there may be activities involving industrial partners, to be laid down in Annexes and Amendments to this Agreement on terms consistent with this one.

Through this Agreement (including its Annexes and Amendments) the parties' obligations in the implementation of the SENSE-Cooperation program are defined.

#### **It is understood as follows:**

##### **Article 1: Parties**

The Agreement is signed between:



The **SENSE Consortium** composed of Stiftung Deutsches Elektronen Synchrotron (referred to as **DESY**), Hamburg, Germany represented by Dr. Thomas Berghöfer,

the University of Geneva, Département de Physique Nucleaire et Corpusculaire (referred to as **UniGE**), represented by Prof. Teresa Montaruli,

the Max-Planck-Institute für Physik (referred to as **MPI**), represented by Dr. Razmik Mirzoyan,

The KIT-Centrum Elementarteilchen und Astroteilchenphysik (referred to as **KIT**), represented by Dr. Andreas Haungs,

on the one hand,

**and**

The University of Heidelberg, Kirchhoff-Institut für Physik (referred to as **Heidelberg**), represented by Prof. Hans-Christian Schultz-Coulon,

The Institute of Cosmos Sciences, University of Barcelona (referred to as **ICCUB**), represented by Eng. David Gascón,

The Institut de Física d'Altes Energies (referred to as **IFAE**), represented by Prof. Ramon Miquel.

The INAF-Osservatorio Astrofisico di Catania (referred to as **INAF-CT**), represented by Dr. Giovanni Bonanno,

The Institute for Space-Earth Environmental Research, Nagoya University (referred to as **Nagoya**), represented by Prof. Hiroyasu Tajima,

The Institut de Física Corpuscular (IFIC), centro mixto del Consejo Superior de Investigaciones Científicas (CSIC) y de la Universitat de València (UV) referred to as **IFIC (CSIC-UV)**, represented by Dr. Llosa Gabriela,



The Université Libre de Bruxelles (referred to as **ULB**), represented by prof. Ioana Maris and prof. Juan Antonio Aguilar Sanchez.

### **Article 2: Purpose**

- 2.1 This Agreement is not binding upon the parties, but it is recognised by the parties that adherence to its provisions is fundamental for the success of the SENSE Cooperation Programme.
- 2.2 This Agreement should lead to open access publications which will be approved by the Consortium in the terms laid down in the Consortium Agreement of SENSE as of the 14<sup>th</sup> of July 2016.
- 2.3 This MoU defines the terms of participation of the parties in the SENSE Programme for non-military purposes only.
- 2.4 Any in-kind contributions shall be deemed to have no financial value.
- 2.5 The partners of this Agreement communicate through a Forum (also called Technology Exchange Platform, TEP). The material in the Forum is based on open access, but registration is needed. Material of other nature has to be exchanged on other platforms and regulated under gentle-man-woman agreements.

### **Article 3: Governance**

- 3.1 Each Institution is represented in the Research Board (RB) by the representatives listed in Article 1. Any representative can be substituted under request of the representative of the Institution. The RB can invite experts if required to its meetings.
- 3.2 At each meeting of the RB a Chairperson is nominated.
- 3.3 The RB meets under request of at least one party otherwise communicates through the SENSE Forum or by email.
- 3.4 The RB has authority of veto on publications proposed under this agreement if the majority (2/3 of the RB members) is against.
- 3.5 The RB discusses and signs Annexes and Amendments to this Agreement, for instance with Industrial Partners or non-disclosure agreements if required.



3.6 The RB is responsible of negotiating and resolving any default or disputes.

#### **Article 4: Duration**

4.1 This MoU will remain in force until/inclusive completion of the SENSE Programme on 31 August 2018, or the ceasing of its approval by the Research Board.

4.2 A party may withdraw from an experiment, and thereby from this MoU, by giving six months' written notice to the Chairperson of the Research Board.

#### **ANNEX 1**

### **Signatures of the SENSE-Cooperation Agreement**

The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program:

**For the SENSE-Consortium:**

Dr. Thomas Berghöfer  
(DESY)



## Signatures of the SENSE-Cooperation Agreement

The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program:

**For the SENSE-Consortium:**

Prof. Teresa Montaruli  
University of Geneva – DPNC



## Signatures of the SENSE-Cooperation Agreement

The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program:

**For the SENSE-Consortium:**

Dr. Razmik Mirzoyan  
MPI, Munich



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**For the SENSE-Consortium:**

Dr. Andreas Haungs  
KIT, Karlsruhe



## Signatures of the SENSE-Cooperation Agreement

The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program:

**Other parties:**

Prof. Dr. Hans-Christian Schultz-Coulon  
Heidelberg University





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**Other parties:**

Dr. David Gascón-Fora  
Institute of Cosmos Sciences (ICCUB)  
University of Barcelona



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**Other parties:**

Prof. Ramon Miquel  
Institut de Física d'Altes Energies (IFAE)



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The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program:

### Other Parties:

Dr. Giovanni Bonanno

INAF – Catania



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**Other parties:**

Prof. Hiroyasu Tajima  
Nagoya University



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Dr. Llosa Gabriela  
IFIC (CSIC-UV)

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Prof. Ioana Maris  
ULB

Prof. Juan Antonio Aguilar Sanchez



ANNEX 2

**Measurements of Hexagonal LCT2 SiPM with and without light guide**

The UniGE agrees to send a light guide (presented by Winston Cone) to the INAF-CT for measurement provided that these will be discussed with UniGE prior eventual publication. The eventual production and usage of light guides for other purposes will have to be approved by UniGE.

The representatives of parties declare that they understand the Agreement that governs the implementation of the SENSE-Cooperation program

**UniGE:**

Prof. Teresa Montaruli  
University of Geneva – DPNC

**INAF-CT:**



Ultimate Low-Light Level Sensor Development

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A handwritten signature in blue ink, which appears to read "Giovanni Bonanno". The signature is written in a cursive style and is centered on the page.

Dr. Giovanni Bonanno