Memorandum of Understanding

between

Forschungszentrum Jülich GmbH
52425 Jülich

– hereinafter referred to as JÜLICH –

and

Consortium of Georgian Universities
Georgia

Composed of:
Ivane Javakhishvili Tbilisi State University (TSU),
Georgian Technical University (GTU),
Ilia State University (ISU)

– hereinafter referred to as GEORGIA –

Preamble

The successful scientific cooperation between JÜLICH and GEORGIA dates back to the early 1990´s with a first agreement signed in 1998. The first Memorandum of Understanding (MoU) was signed in May 2010. Based on this MoU, the mutual cooperation has been fostered within the concept of the so called "Georgian-German Science Bridge" (GGSB), supported by the Ministry of Education and Science (MoE) of Georgia, Shota-Rustaveli National Science Foundation (SRNSF) and JÜLICH.

JÜLICH and GEORIGA discussed on several occasions the opportunities for the long-term scientific and educational cooperation between a consortium of Georgian Universities (TSU, GTU, ISU) and Institutes of JÜLICH (IEK, IKP, INM, PGI/JCNS, ZEA) (hereinafter called the "PROJECT"). In these discussions a mutual agreement about the future of the PROJECT has been achieved: it is intended to further develop the cooperations and to negotiate specific agreements as outlined below.

I. Subject matter of the negotiations

From the present point of view, a contractual regulation of the rights and duties concerning the following project elements is required, which should include but not be limited to the following:

1. JÜLICH and GEORGIA agree to continue their scientific cooperation in the field of **fundamental particle and nuclear physics (**JÜLICH institute **IKP)**; this encompasses existing projects as well as future ventures, and includes the following items:

- Jülich Electric Dipole moment Investigations (JEDI):
  - performing research and development (R&D) for accelerator components and measurement equipment, in particular for the design and construction of a dedicated high efficiency polarimeter system for an electric dipole moment (EDM) search;
  - undertaking joint preparatory experiments at the Cooler Synchrotron storage ring (COSY), including a precursor EDM experiment;
  - conducting R&D work for the design of a high precision EDM storage ring for protons and deuterons.
- Facility for Antiproton and Ion Research (FAIR):

- contributing to developments for the High Energy Storage Ring (HESR) and the internal detector system PANDA;
- performing R&D for the Polarized Antiproton Experiment (PAX).

- Theory:
  - supporting the motivation, analysis and interpretation of COSY and FAIR experiments as well as the JEDI project.

On the part of JÜLICH, this cooperation will be implemented into JARA-FAME, the section "Forces and Matter Experiments" of the "Jülich-Aachen Research Alliance".

2. JÜLICH and GEORGIA agree to continue their scientific cooperation in the field of **condensed matter physics and scattering methods** (JÜLICH institutes **JCNS**, **PGI**); this encompasses existing projects as well as future ventures, and includes the following items:

- Development and microscopic understanding of novel materials and materials systems for information Technology and applications in Energy Conversion:
  - synthesis of multiferroic and magnetocaloric materials;
  - quantitative characterization with various laboratory methods;
  - detailed microscopic studies by means of Electron Paramagnetic Resonance and Neutron and X-ray scattering techniques.

- Application of Grazing Incidence Scattering techniques on thin films and nanostructured systems.

3. JÜLICH and GEORGIA agree to continue their scientific cooperation in the field of **atmospheric sciences and environment** (JÜLICH institute **IEK**); this encompasses existing projects as well as future ventures, and includes the following items:

- Numerics of forward and inverse modelling of atmospheric models:
  - performing research and development (R&D) on the discretisation of icosahedral grids;

- performing R&D on data assimilation with adjoint atmospheric modelling, including preconditioning and minimisation for variational methods and further afield;
- performing R&D on numerical solution of stochastic differential equations of atmospheric processes.

- Development and application of specific analytical techniques for atmospheric process understanding:
  - performing R&D on enantioselective processes of chiral pollutants in the environment and atmosphere;
  - development and application of micro- and nanoanalytical techniques for studying of atmospheric trace compounds.

4. JÜLICH and GEORGIA agree to continue their scientific cooperation in the field of **medical imaging physics (JÜLICH's institute INM**); this encompasses existing projects as well as future ventures and includes the following items:

- Development and application of novel methods for quantitative magnetic resonance imaging:
  - undertaking quantitative mapping of the MRI relaxation parameters;
  - extension of quantitative mapping to include water mapping;
  - application of the developed methodologies to study pathologies such as traumatic brain injury and cancer.

- Application of non-Gaussian methods for the analysis of diffusion in the brain:
  - acquisition and possession of data to investigate non-Gaussian diffusion in the brain;
  - demonstration of the utility of these methods in clinical studies.

5. JÜLICH and GEORGIA agree to expand their cooperation towards efficiently exploiting the capacity of the **Central Institute for Engineering and Technology (JÜLICH's institute ZEA)**, applied to the fields of fundamental particle and nuclear physics, condensed matter physics, in atmospheric sciences, in medical applications and in engineering sciences (simulation and instrumentation). The main focus is to provide

opportunities for young academics to become acquainted with frontier technological processes.

6. Towards the education of students and the training of young researchers, the cooperation of scientists as well as the exchange of equipment, JÜLICH and GEORGIA agree to:

- foster student exchanges by setting up Internship-, Master-, and PhD programs together with German universities, in particular to support Georgian PhD students by preparing agreements between Georgian and German universities within the so called "Cotutelle" program;
- conduct dedicated summer and autumn lecture courses;
- organize common topical workshops and conferences to present and discuss recent results and to plan further cooperation;
- support Georgian scientists in common research and in the exchange of scientific equipment;
- initiate so called joint SMART|Lab's project.

All details such as mutual commitments, deliverables, timelines, and resources will be specified in Annexes to this MoU, to be signed independently by each partner.

II. Legally binding provisions

1. With the exception of the following provisions, no legal obligation for either of the parties can be derived from this Agreement. In particular, there is no obligation to conclude the contracts specified under I.

2. Either party shall bear its own internal and external costs incurred in connection with the negotiations and other relevant measures. Either party shall be entitled to terminate the negotiations at any time without giving reasons, provided that a declaration in writing to this effect is presented to the other party.

3. In case of failure to materialize the PROJECT or to comply with the time schedules agreed upon, the parties shall not bring forward any claim against one another, irrespective of the legal basis. This shall apply, in particular, to claims for damages or the reimbursement of costs due to failure to conclude the contract. The parties,

moreover, shall not be liable for information not being provided at all, or not in good time, or being provided in a faulty manner.

4. Either party shall treat the negotiations and the contents of this MoU confidentially, unless the other party has given its prior written consent to a publication.

5. Either party shall use all and any information obtained from the other party within the framework of the discussions and negotiations exclusively for the purposes (see Preamble) for which it has obtained such information, shall not disclose it to third parties and shall protect it like its own trade secrets. This obligation shall not apply to information that is generally known, information that has been provably derived independently by the party receiving such information, or information lawfully obtained from third parties without infringing any obligation of confidentiality. This obligation shall not be applicable either in case a party is compelled to disclose the information obtained on the grounds of legal provisions. This obligation shall be valid for a period of five *(5)* years after this Agreement has ceased to be in force.

6. Any modifications to this MoU shall be made in writing in order to become valid. The form requirement can only be waived by agreement in writing.

7. This Agreement shall enter into force on the date of signature by both parties. It shall cease to be valid upon conclusion of all contracts required for the implementation of the project and in case the negotiations are terminated, at the latest, however, on 31st of December 2021 *(31.12.2021)*. However, the provisions on confidentiality shall remain valid. If necessary this Agreement can be extended by written agreement.

8. Should a provision of this Agreement be or become ineffective, this shall not affect the validity of the other provisions. The parties undertake to replace such ineffective provision by an effective provision as close as possible to the regulation purpose of the ineffective provision.

9. The exclusive place of jurisdiction for all disputes arising from this Agreement shall be Jülich.

Tbilisi, Gorgia, 07 October, 2015

Forschungszentrum Jülich GmbH

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Member of the Board of Directors

i.V. Prof. Dr. Hans Ströher
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i.V. Prof. Dr. Andreas Wahner
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