Appendix 1 to the Cooperation Agreement

between

Deutsches Elektronen Synchrotron (DESY) Hamburg, Germany

and

The Universitat de València, Spain, through the institute "Instituto de Física Corpuscular" (hereinafter referred to as "IFIC/València")

This collaboration involves investigation of top quark properties and jet physics as well as detector performance studies related to these final state topologies. The proposed activity will aim to develop new phenomenology in synergy with additional experimental analysis methods which can be used at present and future colliders. The targets of such cooperative effort are the present LHC collider, its future upgrades and the future e+e- colliders presently under discussion. The detector optimization will be realized only in the context of future e+e- colliders.

In order to strengthen this collaboration, both Parties agree on the common program, which includes exchanges of visits by scientists, including senior scientists, doctoral and postdoctoral researches, between the partner institutes. To establish effective teamwork on these projects on a daily basis, it is necessary that the collaborating scientists can spend few months at the partner institute. Visits of up to six months by the scientists of each Party are foreseen.

Collaborative work between both Parties will comprise the analysis of collider data, extraction of fundamental QCD and electroweak parameters like heavy-quark masses and coupling constants. Related phenomenology research will focus on multiloop computations in QCD theory for electroweak boson and top quark production at hadron colliders. The main goals of the proposed work are the measurement of the theoretically well-defined top quark mass, extraction of the strong coupling, including their energy dependence and precise studies of top anomalous couplings in view of physics beyond the Standard Model, at current and future colliders. These topics will be attacked from three sides by solving related problems in the theory description of top quark production at colliders, by implementing novel methods for the top-quark mass determination and by establishing the required experimental instrumentation techniques needed to be developed. These objectives will be reached by establishing a joint study group between the partner institutions to advance the experimental and theoretical knowledge.

In the framework of this collaboration, the partners will focus on the promotion of young scientists. Both partners have long standing experience in educating numerous young students and providing training on advanced technology having strong commitment to offer the research trainees excellent support and provide for the necessary progress and review procedures, as well as the necessary feedback mechanisms. The partner institutions have successfully implemented structured PhD programs. The main objectives of the doctoral training are to provide unique training-through-research opportunities and to expose the PhD students to interdisciplinary research in particle physics. The actions of the cooperation will

provide the PhD students with the experience of research in an international environment and mutual secondments to both Parties are foreseen.

Members participating in this collaboration from both Institutions collect a good and successful record of scientific cooperation in past and present common projects. This agreement will strengthen this collaboration.

The project representatives are Prof. J. Fuster (IFIC) and Dr. K. Lipka (DESY).

This agreement shall enter into force upon its signature by the Parties. Its initial duration shall be 5 years, which shall be renewed by written agreement for one-year periods, until terminated by joint agreement or by one Party giving the other six (6) months prior written notification. DESY and IFIC reserve the right to terminate or modify this agreement by a written amendment.

Deutsches Elektronen-Synchrotron DESY

9. 11. 2020

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Prof. Dr. H. Dosch
Chairman of the Board of Directors

Univeristat de Valencia,

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Dra. María Vicenta Mestre Escrivá
Rector of Universitat de València

14 ENE. 2021

Prof. Dr. J. Mnich
Director in charge of Particle Physics