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Letter supporting dr. Pablo Martinez Ruiz del Arbol in his application to become a member of the Young Academy of Spain.

Distinguished colleagues,

I am writing to you in support of the application of dr. Pablo Martinez Ruiz del Arbol to become a member of the Young Academy of Spain.

I have known Pablo since 2010, soon after he started his postdoctoral research position in the Institute for Particle Physics at ETH Zurich, where I was a senior scientist at the time. On numerous occasions over the past 10 years, Pablo impressed me with his analytical skills and his strong work ethic. His ability to identify problems and to suggest innovative solutions is remarkable. He is an experienced team player, and is able to lead a project towards success. He has made several significant contributions to the state of the art in particle physics, as I will illustrate below.

As a particle physicist, Pablo has been an active member of the CMS experiment, one of the two general-purpose experiments at CERN's Large Hadron Collider (LHC). The CMS Collaboration consists of about 3000 physicists and engineers from 200 institutes from 50 different countries. During his PhD at the University of Cantabria, Pablo developed a novel method to align the CMS muon system and was responsible for the geometry databases. This was an important ingredient to be able to analyze the first data of the CMS experiment. He received several awards in recognition of the importance of his contribution to the CMS experiment.

At ETH Zurich, Pablo took charge of the analysis team (~10 students/postdocs from various universities) that was carrying out one of the flagship searches for supersymmetry (SUSY). This particular analysis attracted a lot of attention inside and outside of CMS because of a significant excess in the Run 1 data, and was therefore thoroughly vetted for several months (probably the most scrutinized analysis in the CMS SUSY group to date), which lead to heavy pressure on the analysis team for an extended period of time. Pablo handled the scrutiny of his colleagues in an exemplary way. No mistakes in the analysis were found and the excess later disappeared in the

Run 2 data (it seemed to be purely a statistical fluctuation). All of this further strengthened Pablo's reputation as a very reliable physicist.

In 2013, Pablo was appointed as co-convener of the Monte Carlo and Trigger subgroup of the SUSY group in CMS. As CMS SUSY convener between 2014 and 2016, I can attest to the impressive contributions that Pablo has made here. The load on his group was extremely heavy, since both the Trigger menu development and the preparation for the 13 TeV Monte Carlo production were very active fields in view of the upcoming run of the LHC. I can say with confidence that Pablo's vision, leadership and work ethic have been absolutely critical to ensuring our readiness for the 13 TeV supersymmetry searches. In recognition of his talents, he was appointed him as co-convener of the Third Generation subgroup of the SUSY group (~ 50 physicists) in 2016 where he was responsible for reviewing the results of the various analysis teams.

Recently, Pablo was asked to lead the novel CMS Timing Detector performance studies, an innovative but very challenging project aiming at using precise timing information (~ 50 picosecond precision) in order to get extra constraints to determine the properties of the particles coming out of the LHC collisions.

I will not go into further details of Pablo's analysis and detector work, since it is not particularly relevant to his membership of the Young Academy. However, I believe that the above examples illustrate clearly that Pablo has an extensive experience in state-of-the-art scientific research and in international scientific collaboration, both at CERN and in ETH Zurich, which he would bring to the Young Academy.

In summary, I believe that Pablo has demonstrated great potential as a research leader in our field. He has made important contributions to the commissioning of the muon detectors in the CMS experiment, to the search for supersymmetry and currently in studying the performance of the innovative CMS timing detector. I have worked closely with Pablo in the past 10 years, and I can attest to the fact that he is a smart and efficient physicist, determined to bring his projects to a successful completion. He has creative ideas and is able to lead a team. He is very enthusiastic and has outstanding social skills. He will bring with him a broad international experience, having worked in world-leading universities and research centers. Therefore, without the slightest hesitation, I strongly recommend that Pablo is considered as a member of the Young Academy of Spain. I am absolutely certain that he will make a most valuable asset to the academy.

With my best regards,

Filip Moortgat

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