Cover Letter

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Dear the Neutrino Division of the Fermi National Accelerator Laboratory,

I am writing to apply for the Postdoctoral Research Associate position. I completed my Ph.D thesis last August using the CMS experimental data at Seoul National University. My thesis topic is a search for heavy Majorana neutrinos under the left-right symmetric model at the CMS experiment. Since the search signal has exotic kinematic signature which has not been explored by any other group in the CMS collaboration, I have developed the search program at the CMS and served as the contact person of this analysis. The result is expected to be submitted to JHEP 2021. I am looking for my next research career in neutrino physics by using real neutrino beam instead of collider beam.

During my Ph.D studies, I have performed two additional physics analyses resulted in two publications. I searched for Majorana neutrinos under the type-I seesaw model using 8 and 13 TeV CMS data. I was responsible for modeling of the most dominant QCD background which requires a deep understanding of the CMS detector and its interaction.

On the hardware side, I participated in production and quality control of the GEM muon detector that will be used for the CMS detector upgrades under the high luminosity LHC. In addition, I set up cosmic ray trigger system and multi-wire drift chamber for the cosmic ray test stand at the Seoul National University. Therefore, I am pretty much familiar with electric modules used in high energy physics field such as NIM and VME.

My driving force in my Ph.D carrer was curiosity for mystery of universe. I am deeply interested in neutrino field since it is the world of many unknowns. The field is about to unveil secrets of neutrinos such as mass hierarhcy, and leptonic CP-phase. Those answers can lead to more fundamental questions on the universe. Furthermore, there could be observations for physics beyond the Standard Model. Several experimental results such as reactor anomalies, low energy excesses in the LSND and the MiniBooNE indicated that there could be sterile neutrinos. Lepton universality is seriously challenged by the latest result from the LHCb. Without any doubt, I believe it is the era of physics beyond the Standard Model. And I also believe that the exploration of new physics in both collider and neutrino physics is very important to identify hidden source of new physics. I have searched for Majorana neutrinos for several years using the LHC collider beam. Now, I want to pursue my next career using neutrino beams to accelerate the exploration on physics beyond the SM.

I find the Neutrino Division of the Fermi National Accelerator Laboratory is a leading place of neutrino physics. I would like to develope my research career in this leading institution and make many valuable contributions. I look forward to working with your group.

Sincerely yours. Sungbin Oh.