A letter of recommendation for

Alessio Maiezza

It is for me a pleasure to recommend my student Alessio Maiezza for a post-doctoral position within your group. I have an very good opinion of Alessio both human and as a physicist, and I believe that he has a potential to develop into a very good physicist. Let me argument about this.

Alessio was a very good student in his MS degree at University of L'Aquila, which he carried out under the supervision of F. Vissani and with support of myself, addressing the phenomenology of Left-Right models as particle physics models beyond the Standard Model, including new sources of neutrinoless double beta decay, which is actively probed at the INFN Gran Sasso Laboratories.

The Left-Right minimal model is a compelling case of new physics offering a very righ phenomenology, with signals testable at colliders and in low energy processes, which feature at the same time new interactions, parity restoration, and Majorana nature of neutrinos! Alessio was very attracted by these phenomenological studies, and he decided to apply for the PhD in University of L'Aquila to continue working on Left-Right models, despite other choices.

During the first part of his PhD his efforts to understand completely this theory brought also me and Goran Senjanovic to a reconsider the phenomenological predictions in this model, and eventually turned into the first work with a complete analytical and also numerical study of the predictions in the quark sector, assessing the realistic bounds on the scale that one may expect at LHC for the a possible W_R gauge boson. This work has now become the reference for the theoretical and LHC community searching for parity restoration at collider. Let me remark that this happened for a theory which was put forward more than 30 years before, and studied by a number of scientists, including its inventor, Goran Senjanovic itself. In this work the contribution of Alessio was essential.

This I described to highlight a kind of maturity on what is sensible phenomenology, that it is not usually found in average PhD students.

We noticed during that work that some issues in the new physics of flavour were still unsetteld, and Alessio found natural to address them in our next actvity. He thus considered the chromomagnetic flavour changing vertex given from new physics interactions, which I asked Alessio to recalculate independently, along with the known case of the Standard Model. This nontrivial calculation took some time, also because Alessio was finding a discrepancy for the SM with the very classical paper by Inami and Lim. Indeed such discrepancy turned out later to be the right result (and there is an Erratum of course!). This I believe testifies the independency of calculation of Alessio.

The study of the chromomagnetic flavour changing bounds required then to address its hadronic matrix element, which brought Alessio to study Chiral Perturbation Thery and in particular the Chiral Quark Model (one of the few methods for a phenomenological nonperturbative estimation), the nonperturbative fixed point gauge which is suited to connect with the gluon condensate, and the renormalization group running from the high energy scales to the low energy scales. This part of the project benefitted from the collaboration with S. Bertolini at SISSA, who had previously applied that technology. The activity resulted in a second work, which crucially corrects the previous calculations of the hadronic matrix element, and then applies the results to a wide class of possible new-physics models. The contribution of Alessio in this second work was very important.

At present Alessio is working to assess the missing hadronic matrix elements for other (new physics) flavour changing transitions, and this now requires mastering advanced issues like scheme dependence or evanescent operators, to name a couple.

I just wish to observe that it is really nice to see him learn with passion and without fear many disparate technical notions and at the same time conserve a clear mind on the real physical applications. I believe these to be the signs of a potential very good physicist.

Alessio is a serious, enjoyable and courteous person, and at the same time a hard passionate worker. He has a mild but firm character, with some certitudes which make him sometimes obstinate. I believe this to be mostly on the positive side though, since he is also good at listening to advices. His english needs to substantially improve like many italian students, but I see even this progressing steadily.

To close, I believe that Alessio will be a very good addition to your group, and I thus feel very confident in recommending him.

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