

High Energy Physics LatinAmerican-European Network (HELEN)

Present

Hereby I present the report stating the description of my activities during my stay at the National University of Mexico (UNAM) and at the Physics Department of Cinvestav (Mexico) from July 1 to August 1 2006.

- At the UNAM I worked under the tutorship of Professor Myriam Mondragon Ceballos. We directed our efforts to the research of the topic concerning the flux of the Renormalization Group Equations in Field Theories with extra dimensions. Previous work by us had shown that a model with $SU(5)$ as gauge group is characterized in physical dimensions greater than four by a much faster approach of the running coupling constants towards the infrared fixed points of the theory, compared to the four-dimensional case, this due to their power law running behaviour. Therefore, tighter restrictions can be imposed to the couplings at the infrared region, enhancing thus the predictivity of the theories. During my stay we focus our research in the optimization of the computing code for the calculation of the running of the constant couplings, specifically we tested the implementation of new and improved algorithms that fastens the calculations and therefore enhances the accuracy of the calculations of the predictions of the theory. We tested the new algorithms on our previous results and found a small but significant improvement on the accuracy of the results.
- At the Cinvestav I worked under the tutorship of Professor Omar Miranda. We focused our research towards the investigation of the possible consequences of including non-standard interactions of neutrinos with quarks in the framework of previously proposed experiments to measure the CP violation phase with monochromatic neutrino beta beams from electron capture. Although we have no concluding

results we nevertheless have started a fruitful collaboration partnership between the two groups.

- I gave a parallel talk ” A monochromatic neutrino beam to obtain $U(e3)$ and the CP phase” at the Advanced Summer School 2006, hold in the Physics Department of Cinvestav (México) on July 10-14, 2006.
- I attended the lectures of the Advanced Summer School 2006, held in the Physics Department of Cinvestav (México) on July 10-14, 2006.
- I wrote the letter corresponding to my talk for publication in the proceedings of the above mention summer school.
- I gave an informal talk to the group of Professor Miranda concerning the detailed set up of proposed experiment on monochromatic neutrino beams from electron capture for the research of the CP violation phase in the leptonic sector.

Attached you will find the official letters stating my participation on the previously mention summer school.

I find the organization of the network highly smooth and efficient, and the possibility of collaborating with many different groups very encouraging from the point of view of research opportunities.

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