

Alignment and Calibration of the Forward Preshower (FPS) Detector at D0

Faculty Research Grant 2003 – Closing Report

1. *Description of grant-supported activities.*

I spent the summer of 2003 at Fermilab to help with calibrating and aligning the Forward Preshower (FPS) detector at D0 as described in the grant proposal. This involved understanding how the tracks are obtained from the signals detected in the Central Fiber Tracker (CFT) as well as how the FPS works. I wrote an analysis program to compare the direction of the tracks found in the CFT to the hits in the FPS. As a result of my analysis, several mapping errors were found and corrected, and the FPS reconstruction software was rewritten. I gave a progress report on these results at the annual D0 workshop in Beaune, France, in June 2003.

2. *Were you able to complete the project? Describe any difficulties you had.*

Most of the analysis in terms of one of the angles was done by the time I came back to IUSB at the end of August. I continued to work with Drew Alton, one of the postdocs involved in this project, during the fall semester, but progress became too slow eventually. In November and December I met several times with David Lam, a Notre Dame graduate student, who took over the rest of the analysis.

3. *Did, or will, the project result in a specific product – a manuscript, composition, syllabus, etc.? If so, please describe and indicate state of development.*

As explained in the grant proposal, D0 publishes all their results as a collaboration, with the names of everyone who has in any way contributed to the experiment on the author list. In order to be added to the author list, one rule is, that one has to have been working full time on D0 for one full year. The faculty research grant made it possible for me to spend the full year at Fermilab and as a result I was added to the author list in Fall 2003.

The first D0 paper with my name on it ("Search for Doubly-charged Higgs Boson Pair Production in the Decay to $\mu^+\mu^+\mu^-\mu^-$ in $p\bar{p}$ Collisions at $s^{*1/2}=1.96$ TeV"; hep-ex/0404015) was submitted for publication to Phys. Rev. Letters in April 2004.