

hello raja,

eric and i had a chat and agree that we are still too much in the dark about MIPP, and would like to hear more from you about what is planned.

in your talk you seemed to concentrate on relations between different high energy cross sections.

of course in spectroscopy we are mainly interested in identifying resonances and determining their properties, especially unusual types like glueballs, hybrids, multiquarks, molecules etc. can you tell us what MIPP would do in those areas?

Dear Ted and Eric,

Fermilab has always found it difficult to assign a priority to non-perturbative QCD experiments from the early days of the 30" bubble chamber (1970's). The reasons are many-fold, the chief among them being the inability of theorists to calculate anything meaningful in non-perturbative reactions. So these very important reactions have been declared as un-interesting and not worth investigating. I designed MIPP to counteract this, since I have these very fundamental scaling relations to verify in inclusive reactions. These, if verified by MIPP will be general relations for all inclusive reactions(MIPP will look at 36 reactions) and will impact even the way we do perturbative deep inelastic reactions, since the essence of the scaling is the presence of strong final state effects. MIPP has the best acceptance and particle ID of all experiments done to date. In order to get MIPP approved, I had to "sell" it to the Fermilab PAC/director as being able to do service measurements for MINOS target production. Even today, the Fermilab directorate views this as MIPP's most important measurement!

However, I had to build a very good secondary beam to do this. This has a primary target on which 120 GeV protons impinge. The 6 secondary beam species ( $\pi, K, p$  +/- charges) are identified by beam cerenkovs and ToF counters (for momenta less than  $\sim 7\text{GeV}$ ). Information about MIPP can be found off our web pages

<http://ppd.fnal.gov/experiments/e907/>

The funding from MIPP came initially from Livermore to build the experiment. Fermilab agreed to provide the beam. Since Livermore wanted to measure nuclear cross sections for proton radiography, they spent ~\$2Million on MIPP. Fermilab also chipped in ~\$2Million in labor as well as the beam. Because of the unfortunate PAC wording upon approval of "low priority", the DoE felt that they did not have to explicitly support the experiment by funding the Universities on MIPP. However, the MIPP Universities (Harvard, S. Carolina, Iowa, IIT, Virginia) have provided graduate students. We continue to argue with DoE for graduate student and travel support for universities on MIPP! My point is that with some little additional investing, we can make MIPP a great success without detracting from all the other costlier experiments at Fermilab.

in particular there is a real need for a low energy kaon beam (esp.  $K^+$  and  $K_s$ ), to clarify what is going on in the KN system. are there plans along those lines at MIPP?

The MIPP secondary beam has been run at as low a momentum as 5 GeV. I have since done calculations which show that 3 GeV is easy to do. At 1GeV, we get too many K decays. I had significant interest at MIPP from Mark Manly and others. I plan to submit an upgrade proposal to the PAC in March which will speed up the TPC electronics (DAQ) by a factor of 20. This will enable us to do first rate KN and pentaquark physics while MINOS is running. Currently with MINOS turning on, we will be restricted to one 4 second slow spill a minute. The DAQ currently is capable of taking data at 60 HZ.

can you tell us where there is a MIPP web site we might look at? we are especially interested in learning who would be doing the data analysis, what beams and targets will be used, what final states you are sensitive too, who does the PWA - in other words all the grungy details.

best regards  
ted barnes

The proposal for MIPP-I can be found at  
[http://ppd.fnal.gov/experiments/e907/Proposal/E907\\_Proposal.html](http://ppd.fnal.gov/experiments/e907/Proposal/E907_Proposal.html)

Read also the addendum. In the proposal, in addition to the scaling laws, we proposed to look for glueballs and other exotics (page 28 of Proposal 2000). We did not explicitly mention partial wave analyses. Currently, our collaboration does not have the expertise to do PWA. It can grow one. However, with the MIPP upgrade proposal, we will have more collaborators. Manly and co from Crystal ball as well as a few pentaquark folks have expressed interest. We have also promised to make the MIPP data available as DST's on DVD's. So after we are done with it, others can analyze the data and do their own PWA's.

The main point I am making is: MIPP is now going head on with MINOS for our data. When MINOS turns on, all political pressure would be for them to acquire their data as rapidly as possible. MIPP can get its data with a few additional weeks of slow spills. These additional weeks will have little impact on MINOS after 1-2 years of running. It is however hard to fight this political battle. Any help the GHP group can do by writing a letter of support to Mike Witherell will help. You can also mention the upgrade proposal if you like, which will have an explicit chapter on PWA's. However, if MIPP-I does not get its data due to political insensitivity on the part of the Fermilab management, then MIPP-II will have little chance of being approved and hadron physics will have lost its tentative foothold at Fermilab.

Best regards

Rajendran Raja