

Achievements of the PRad Collaboration

- 1) PRad experimental setup developed, constructed and tested for a short time period.
- 2) Installation and commissioning successfully accomplished.
- 3) High quality, large scale experimental data is collected.
- 4) Our data set is unique to have a significant impact on the “Proton Radius Puzzle”.

Few Organizational Remarks

(important for future work)

- ✓ As any stand-alone, large scale experiment, the PRad had and still has a sponsor: the NSF with the **MRI award #PHY-1229153**
 - a) it fully supported the novel hydrogen gas flow target;
 - b) plus what we needed by that time.
- ✓ For sure, PRad got additional supports: however, those are secondary supports.
- ✓ The rules of any sponsoring organization requiring a very proper “**acknowledgment**”
- ✓ It is also clear that any presenter of a PRad talk has his/her own institution and own supporting awards and/or organizations.
- ✓ Therefore, we have to discuss, agree and follow a standard procedure of “**acknowledgment**”.
- Suggested example:
 - PRad is supported in part by NSF MRI award #PHY-1229153 as well as DOE awards for the GEM detector
 - my research work is supported in part by NSF awards: PHY-1506388 and PHY-0855543

Initial Tasks for the Data Analysis Work

- 1) Data redaction to be done soon .
 - a) FASTBUS sparcification for HyCal;
 - b) GEM zero-suppression.

- 2) Prepare Tagger information for all calibration runs
 - a) timing of T-counter;
 - b) timing of E-counters, define energy for each event;
 - c) Record the data in an easy-to-use format.

- 3) Calibrate HyCal with tagger:
 - a) develop, identify or use the PrimEx cluster algorithm;
 - b) develop, identify or use the PrimEx energy calibration procedure;
 - c) develop, identify or use the PrimEx coordinate reconstruction algorithms;
 - d) extract the trigger efficiency vs. energy for several typical region of HyCal.

- 4) Calibrate HyCal with physics events (Mott and Moller):
 - a) Identify the “good runs” for each energy and target (fully empty, empty, hydrogen, ^{12}C);
 - b) calculate the gain factors for each channel for each “good” production run, record it;
 - c) identify a list of runs for each energy to be used for the physics calibration;
 - d) find the calibration constants for those runs, check with gain-factors, save them;
 - e) find the “beam-position” for each run by Moller events in HyCal, save them in data base

Initial Tasks for the Data Analysis Work (cont.)

- 5) GEM: initial data reduction (???? needs more discussions)
 - a) make very “lose” cluster identification;
 - b) match with the HyCal to identify final clusters;
 - c) find the “beam position” for each run by Moller events
- 6) Define the PRad coordinate system;
 - a) transfer GEM and HyCal coordinates into this system for each run.
- 7) Extract event yield for Mott vs. angle and Q^2 for both energies.
- 8) Extract event Yield for Moller vs. angle and Q^2 for both energies.
- 9) At this point we need to call the next collaboration meeting!