WBS 1.6 Software

1. An internal review on PXL Survey and related software procedures has been scheduled for May 17 at BNL.

2. Full Simulations exploring the physics capabilities of various PXL prototype configurations were performed and reported to the Collaboration as part of the BUR 13/14 discussions. The bottom line is that if we get a few weeks worth of good mbias Au+Au data, we should be able to get initial results on charm cross section and R_{CP}, but it is up to the Collaboration to decide its priorites.

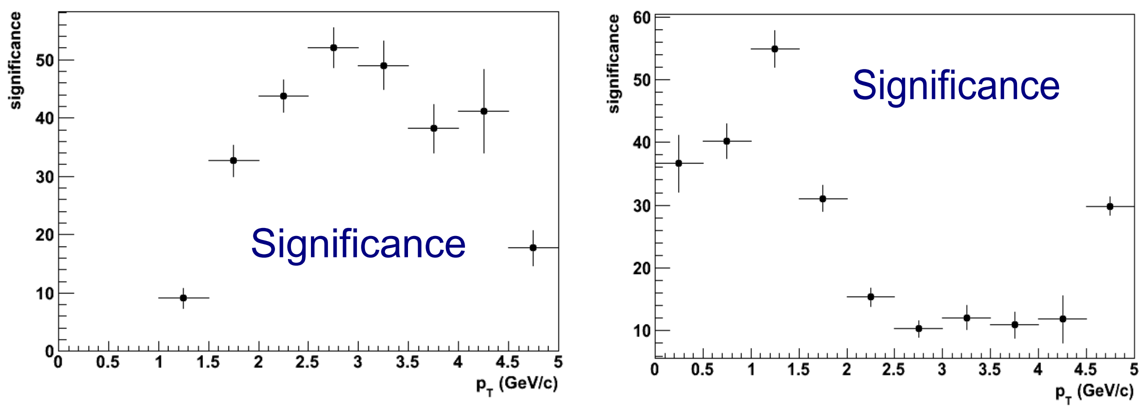

Figure 1 Signal significance as a function of transverse momentum for a three-sector prototype PXL detector configured as *Adjacent*-sectors (left panel) or as a *Star* (right panel). Notice the different (complementary) p_T acceptance of the two configurations.

3. Survey work is moving on well on both the PXL and SSD sides.
   - On the SSD side we started making survey measurements on a ladder shipped from Subatech. The figure below shows the ladder resting on the survey machine (left) and some fiducial marks and their relation to sensor strips (right).

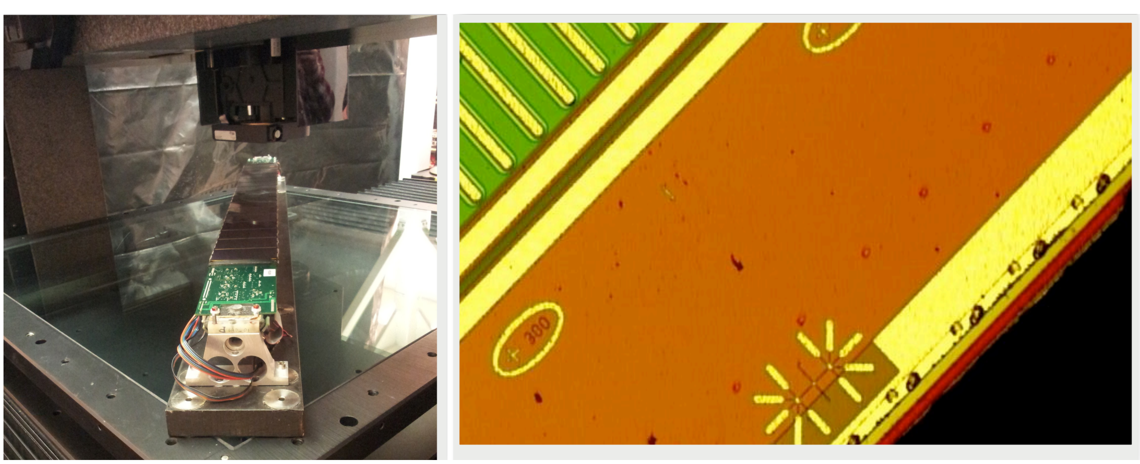

Figure 2 An SSD ladder in the Survey equipment (left) and two fiducial marks and sensor strips as viewed with the survey camera (right).

- Initial measurements to determine the gravitational bending (sagging) of a ladder as well as repeatability of the measurements in general (see figure below).

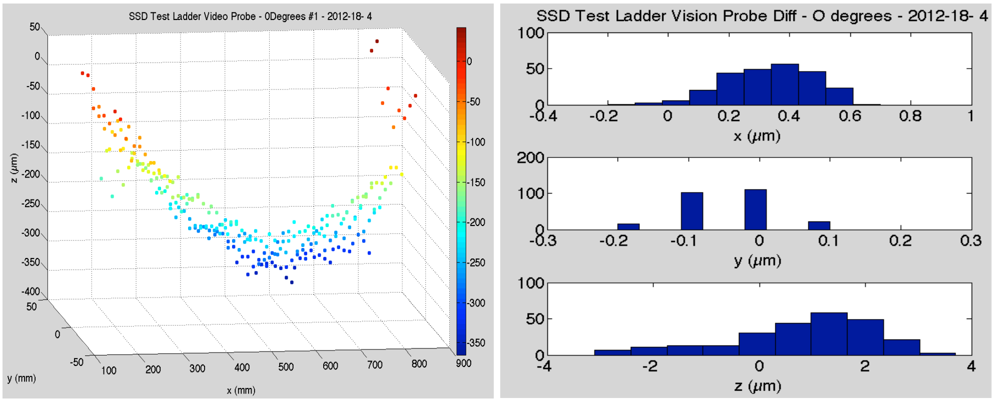

Figure 3 Measurements of an SSD ladder planarity (left), showing a max bending of ~400 microns. The right panel shows results on how repeatable are the measurements of the same ladder but at different times.

- Initial measurements using a 3-sensor-prototype ladder were performed. The goal was to a) determine survey-able fiducial structures on the sensors, b) program the machine for automatic operation and c) check the sensor planarity when glued on the ladder support. The pictures below shows some results on these points.

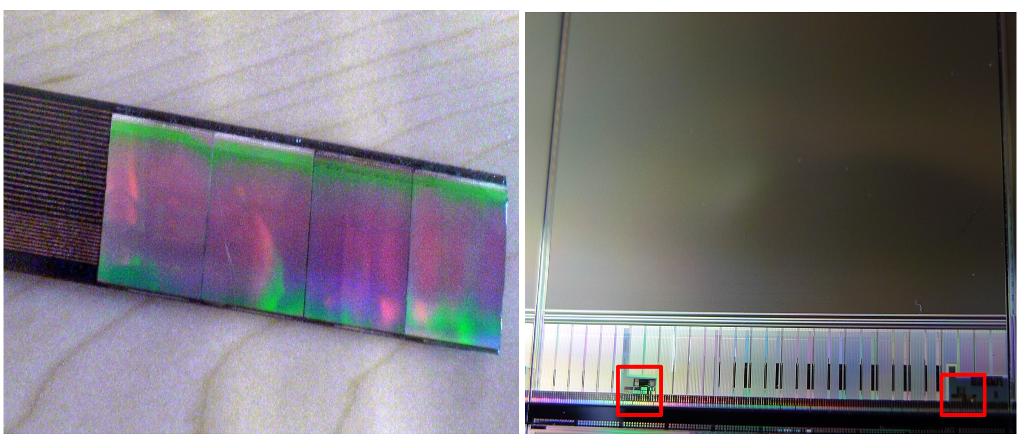

Figure 4 (Left panel) The 3-chipe prototype ladder. (Right panel) One sensor with two possible fiducial features identified.

- Initial draft of PXL survey conventions (e.g. coordinate systems etc) and procedures is completed.

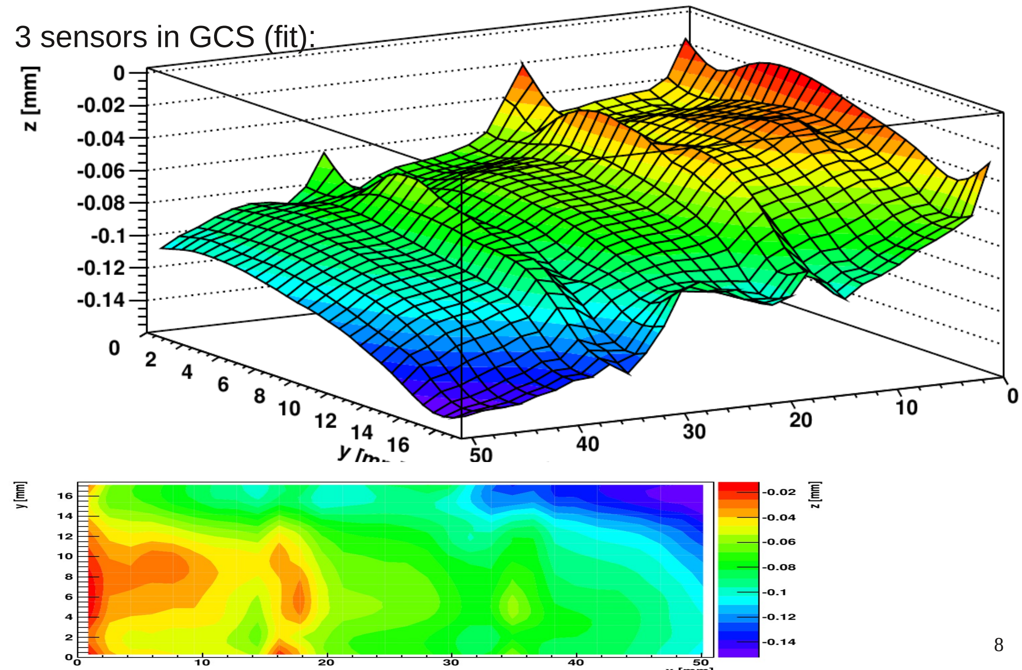

Figure 5 **Space mapping of the 3-sensors on the ladder. Notice that deviations from planarity are only a tens of microns.**

4. A full simulation was performed in order to determine the hit density background due to electrons generated in peripheral (non-touching) Au+Au electromagnetic interactions. In this simulation the hits coming from spiraling electrons in the PXL layers was also determined. The results show that spiraling accounts for a sizeable fraction of the total number of hits. The results from this study are going to be used in future simulations. The figure below shows the hits/cm^2 in the two PXL layers.

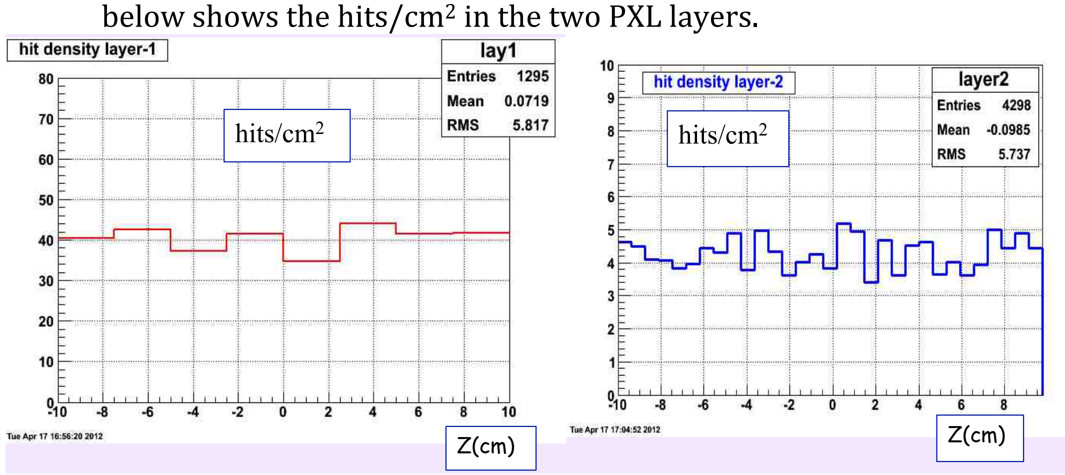

Figure 6 **Hit densities (hits/cm^2) in both layers of PXL detector due to UPC electron pileup events.**