SuperB SVT test-beam, Superpix0 analysis status

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Summary

- update since last (October 28) presentation
- efficiency vs. incidence angle w.r.t. normal incidence (in x-z)
- ♦ at large angles (e.g. 30-45°)
 - macroscopic loss of efficiency
 - resolution degrades (also for geometrical reasons)
 - cluster multiplicity changes (geometry but also inefficiency effects)
- simulation to reproduce what observed
- conclusions

Efficiency estimate procedure

- \blacklozenge align the DUT by fitting the *x*, *y* residuals with a Gaussian
- \blacklozenge count the extrapolated tracks into the sensitive area (using also correct slice in y)
- count hits (closest ones) compatible with track extrapolation
 - ▶ max hit-track distance was 50 μ m in x, y → now max hit-track distance 200 μ m in x, y
 - without increasing max hit-track distance cut one underestimates efficiency at large angles
- efficiency = hits / tracks in sensitive area

Efficiency vs. threshold (updated to new distance cut)



Efficiency vs. incidence angle w.r.t. normal



Residuals degradation at $15^{\circ}, 30^{\circ}, 45^{\circ}, 60^{\circ}$







Cluster multiplicity at 0°





Cluster multiplicity at 15° , 30° , 45° , 60°







Cluster multiplicity u view at 15° , 30° , 45° , 60°







Cluster multiplicity v view at 15° , 30° , 45° , 60°







Understanding degradation at large angles

- ♦ on pixels charge is shared in two dimentions → threshold at 1/4 of m.i.p. too large
- however, the degradation is larger than naively expected
- investigate efficiency vs. distance to center of pixel (no significant change)
- simulation to understand what effective threshold can reproduce data
 - Marcin will report on that
 - apparently effective threshold / m.p.v. of energy release is larger than 1/4
 - observations in general seem compatible with threshold effects

Efficiency vs. distance from center of pixel in v view



Service communication

- Benjamin Oberhof has released code for aligning detectors with Millepedell
 - minimal documentation: Sbt> scripts/MPDataAlignment.sh -h
 - alignment data in different format than testDataAlignment
 - not thoroughly tested yet

Conclusions

- results here come from fruitful collaboration of many, this is just an incomplete list:
 Stefano Bettarini, Marcin Chrzaszcz, Nicola Neri, Benjamin Oberhof, Antonio Paladino
- some more work is needed to use the whole statistics, but results here include most usable data