Curved surface - update

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DESY/HH alignment meeting 02.03.10

Surface

- Si strip sensor/module surface w(u,v)
  - Parametrized by orthogonal (Legendre) polynomials

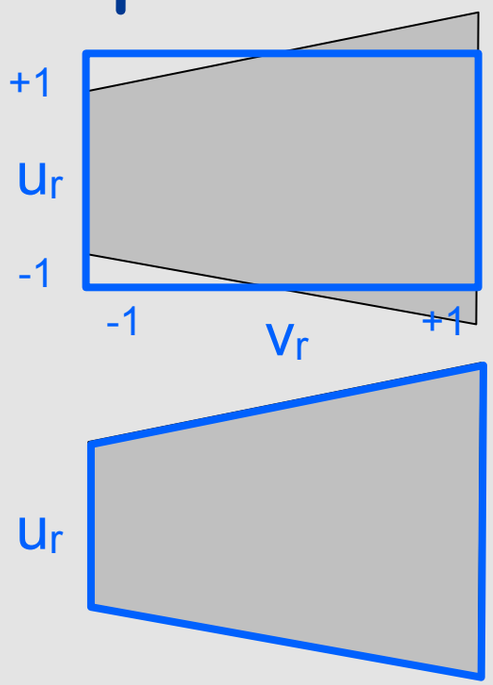
$$w(u_r, v_r) = \sum_{i=0}^{N_l} \sum_{j=0}^{i} c_{ij} L_j(u_r) L_{i-j}(v_r) \qquad x_r = 2x / \mathrm{len}(x), \quad \text{uniform in } [-1,+1]$$

  - Until now: N_l=1, flat surface
  - New: N_l=2, curved surface, sagitta $S_u = \frac{3}{2} c_{22}, S_v = \frac{3}{2} c_{20}$
  - Neglecting additional terms produces systematic error

$$\sigma_w^2 = \frac{1}{5} c_{20}^2 + \frac{1}{9} c_{21}^2 + \frac{1}{5} c_{22}^2$$

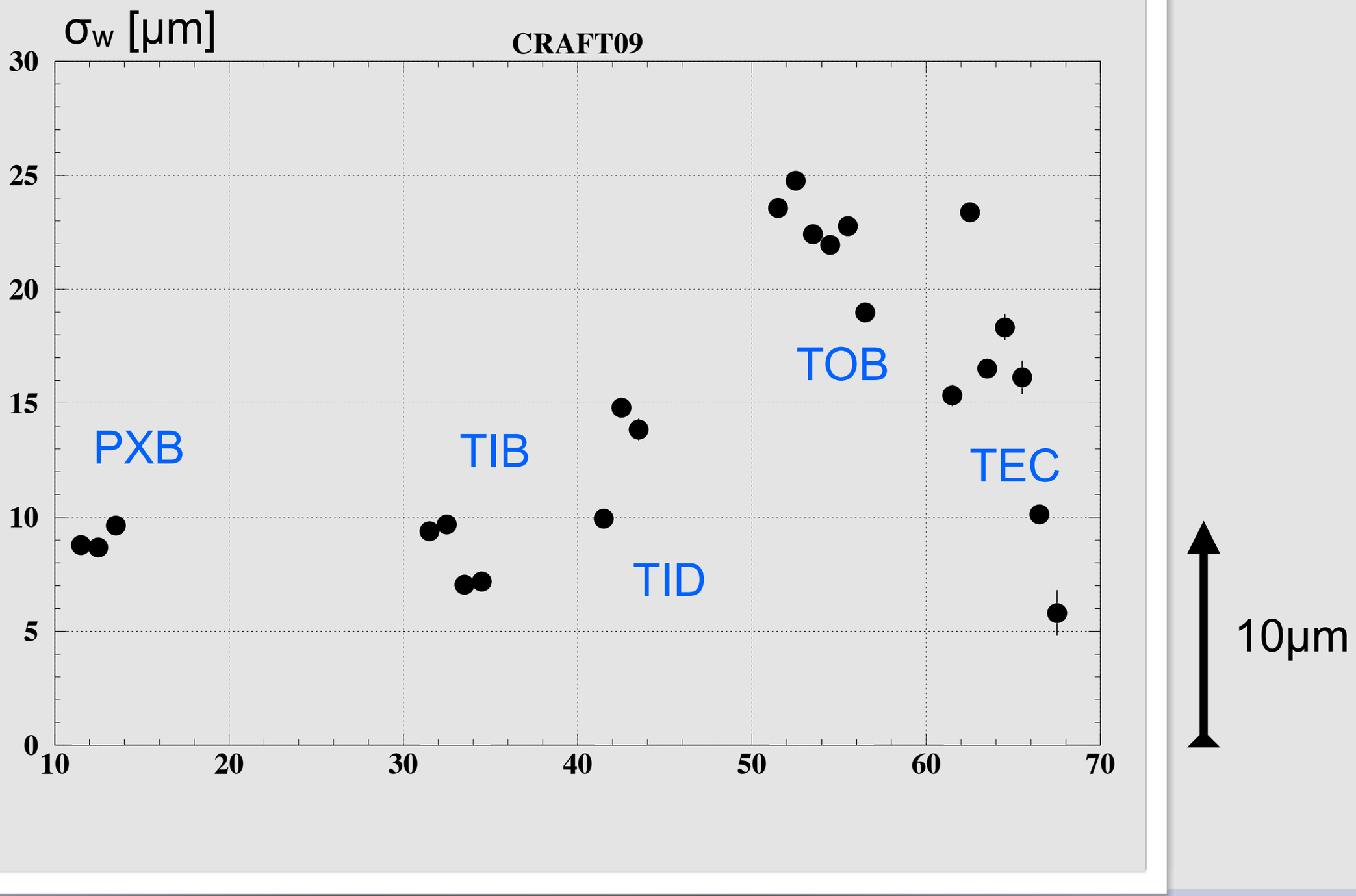
Orthogonality: $\langle L_n L_m \rangle = \delta_{nm}/(2n+1)$

- ★ Coefficients c_{ij} are uncorrelated
- ★ Shape of (u_r, v_r), endcap sensors: trapezoid
  - ▸ Now: len(u) at average v
    - ✦ Const curv., sagitta(v), $\langle L_0 L_2 \rangle \neq 0$
  - ▸ Next: len(u) at local v
    - ✦ Const sagitta, curv.(v), $\langle L_0 L_2 \rangle = 0$



- ★ Uniformity of (u_r, v_r)
  - ▸ Cosmics: uniform (above ground), but acceptance !?
  - ▸ Collisions: uniform in u ~ φ, but not v ~ Z, R

Radial dependence σ_w



For details see:
(page 9-12)

Alignment meeting talk 19.02.10

Summary and Outlook

- Proper ansatz for $w(u_r, v_r)$
- Uniformity in v may be difficult

- Large scale run
  - First test by Frank hit 8GB limit
- Angular dependence of hit error
  - Anything else but $\sigma_w \cdot \tan(\text{track angle})$?