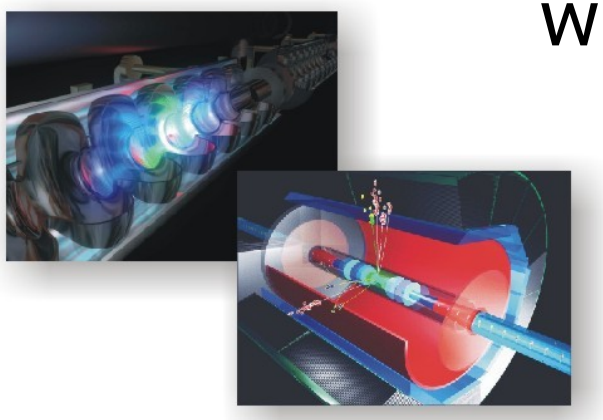
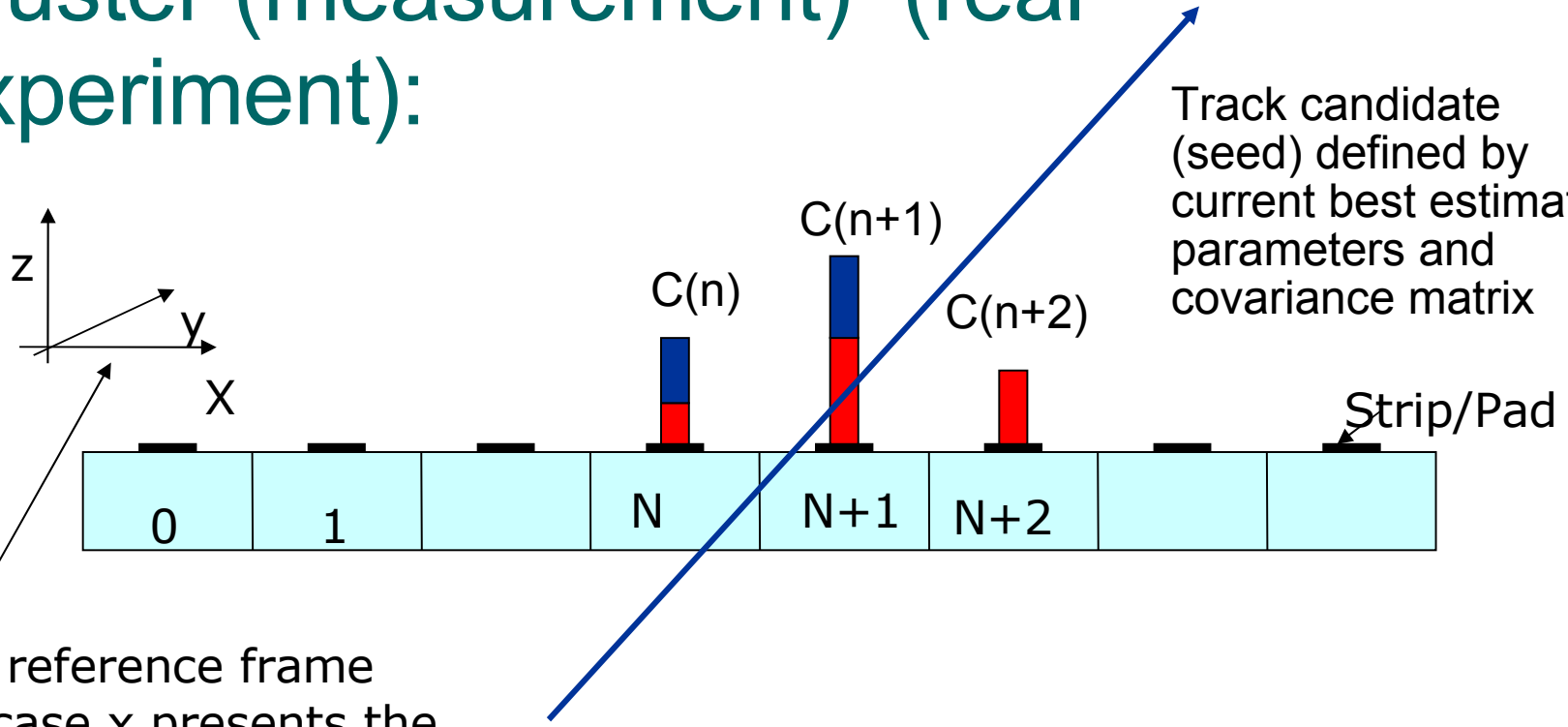
Clusters (again)

- need to be ready to incorporate annoyances like misalignment.. and allow for improvements (e.g. Hall effect corrections) to achieve the best precision possible
- It's good to think beforehand where we want to put the hooks



Cluster (measurement) (real experiment):



Sensor reference frame in this case x presents the measurement direction

-Cluster: List of Strips/pads (N to N+2) and the charge recorded on them (C(n) to C(n+2) belonging together
-Center of gravity of Cluster: provides uncorrected position measurements in detector reference frame
-Nr. of strips, pad/strip size etc. provide precision of local measurement. (covariance matrix/ local coordinates)
- configuration.

Use of cluster in Tracking.

- Need nominal detector position and orientation to be able to transform to global coordinate system (e.g. required by track fitter)
- Only when the cluster is considered to be part of a track candidate can all corrections be made:
  - Alignment (need to know z-information in case of strip)
  - Hall effect correction: needs incident angle of track on sensor.
  - If more than one track might want to consider splitting the cluster etc.

Cluster Class
very lightweight and very well defined

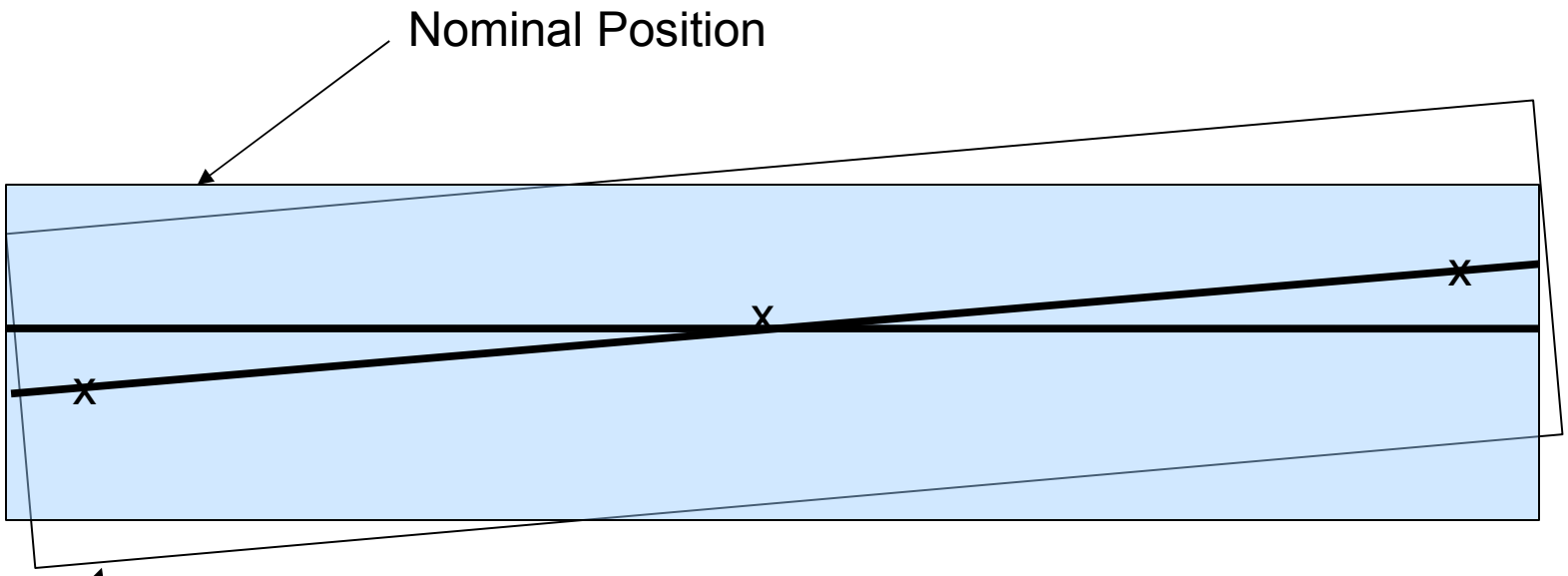
- Data member: Detector ID, array of strip numbers and charges
- Methods:
  - GetThe ID()
  - GetTheArrayofChargesand strips()
  - GetPosition() (in local coordinates)
  - GetPrecision of this measurement.
  -

Local to Global transformation

- Probably the logical point to apply all this corrections (CDF)
- Input:
  - Sensor: nominal position, alignment (displacement tilt), type of Sensor (Strip) and orientation (Magnetic field and detector properties)
  - Cluster:measurement x and precision
  - Track parameters: best estimate of intersection with sensor and incident angle.
- Output:
  - global position vector (associated with Track candidate)

In an ideal world (current simulation):

- Detector is perfectly aligned
- no hall effect (lorentz angle)
- can use dummy routine/classes to get the non-corrections but can replace the dummy routines as things evolve.



Misalignment: deviation of nominal position coded by displacement vector and tilt angles.
Pattern recognition probably driven of nominal detector and all corrections are only done when cluster is used on the track.