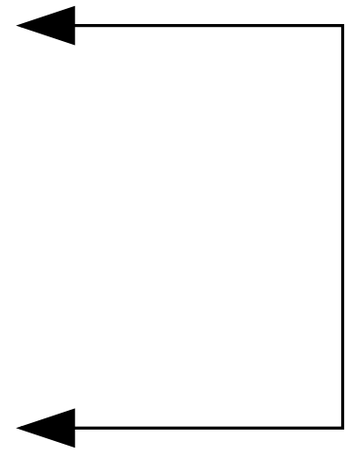
What are we doing???

Jim Pivarski

- Searching for $e^{\pm}$ in the High Level Trigger

  1. must be fast
  2. efficient for $e^{\pm}$
  3. reject background

- Developing a reconstructed-electron object

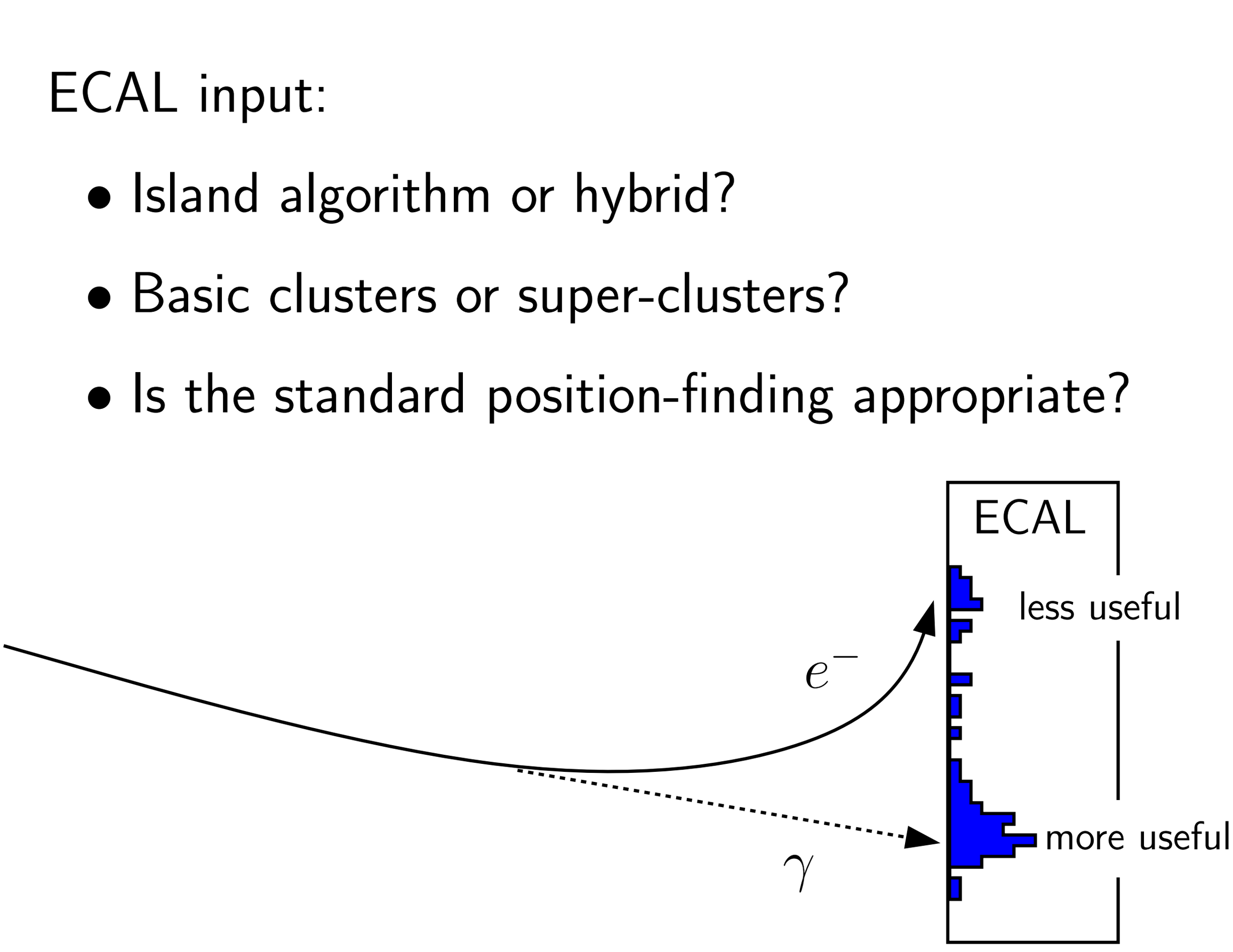
  1. should contain raw hits in an (η, ϕ) wedge for re-processing

Concentrating on the trigger part for now. . .

- *after* cluster-finding and *before* tracking
- use (η, ϕ) to constrain track parameters
- use E_T to constrain track curvature
- minimum E_T goal: 10 GeV $\longrightarrow$ 3 cm sagitta
- assume track passes through origin for now, later widen to $\pm$15 cm in Z (like pixel tracker algorithm)

ECAL input:

- Island algorithm or hybrid?
- Basic clusters or super-clusters?
- Is the standard position-finding appropriate?



Tracking output:

Seed (two hits)	Cloud (all hits)
use existing tracking code	use cluster information more thoroughly
easier to implement	harder, with more tunable parameters
may be inefficient and slow	robust and hopefully fast

We're implementing both.

performance plots *soon*	improvements in performance

Seed-finding algorithm:

1. Select elements of

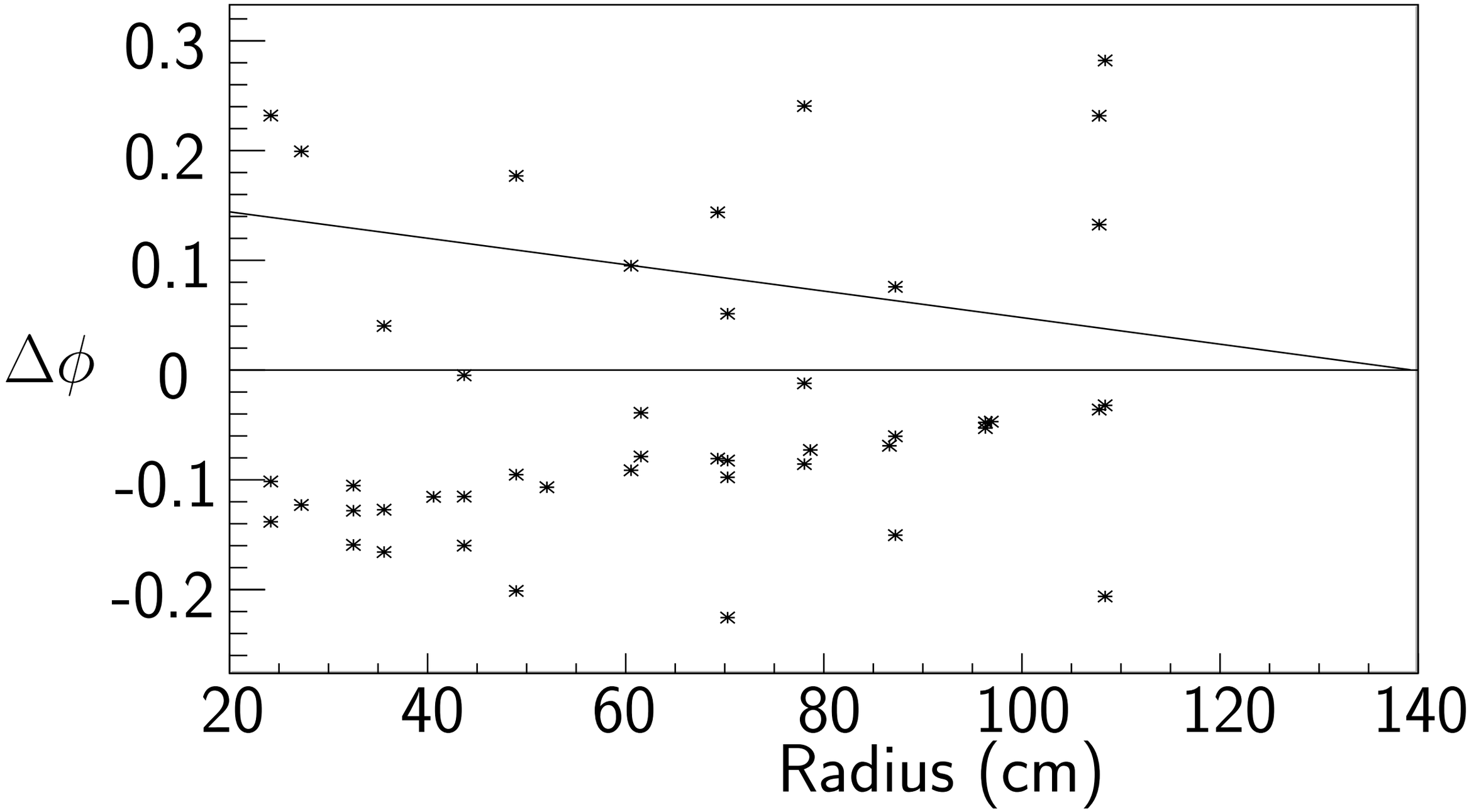
$$\texttt{RoadMap (a.k.a. ``roads'')} =$$
$$\{\text{inner } \texttt{DetIds}\} \times \{\text{outer } \texttt{DetIds}\}$$
that form straight lines from origin that extrapolate to our cluster

2. Find pairs of hits on these `DetIds` that point to our cluster

3. Do full tracking to determine which survive and E/p

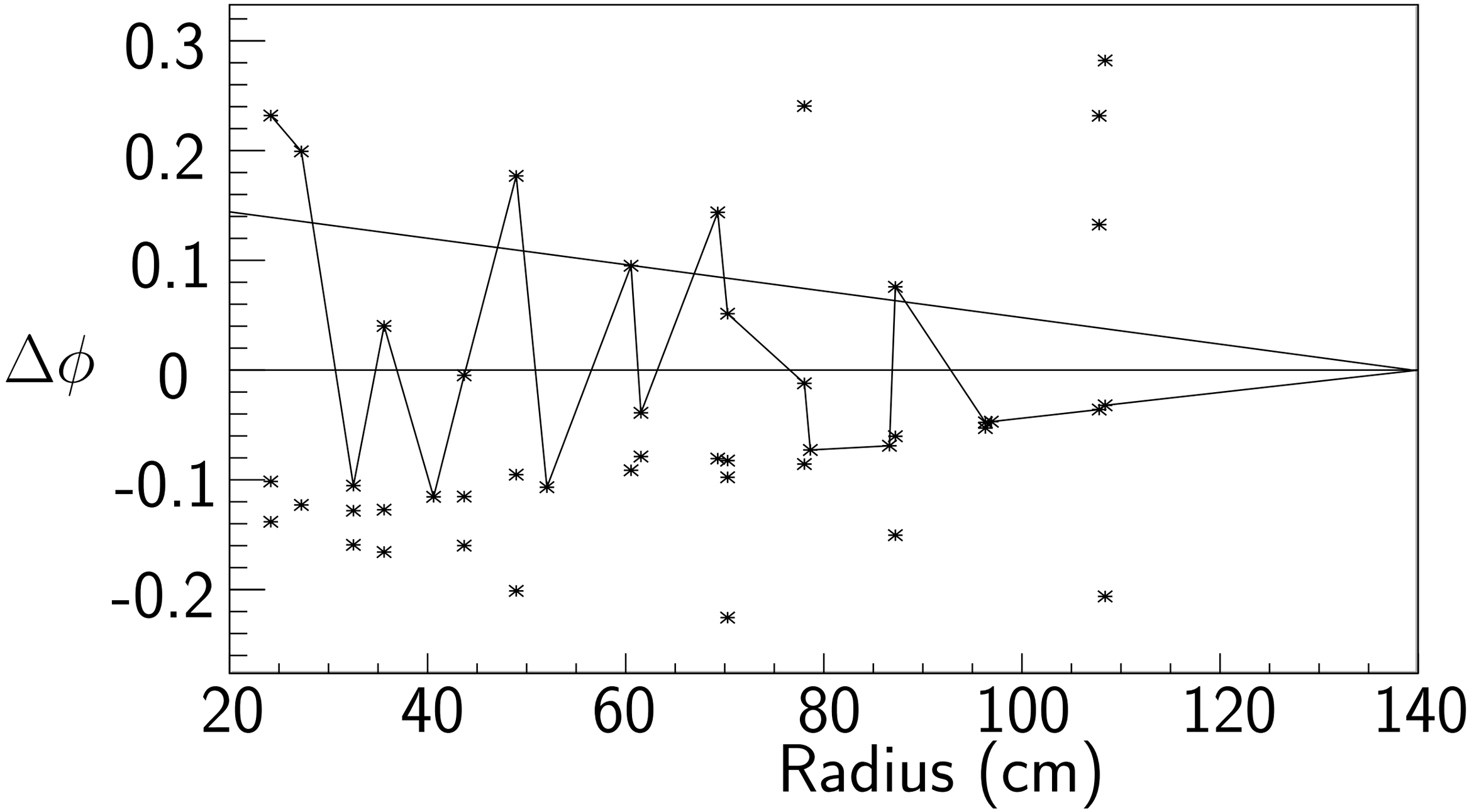
Cloud-forming algorithm:

1. Project closest track



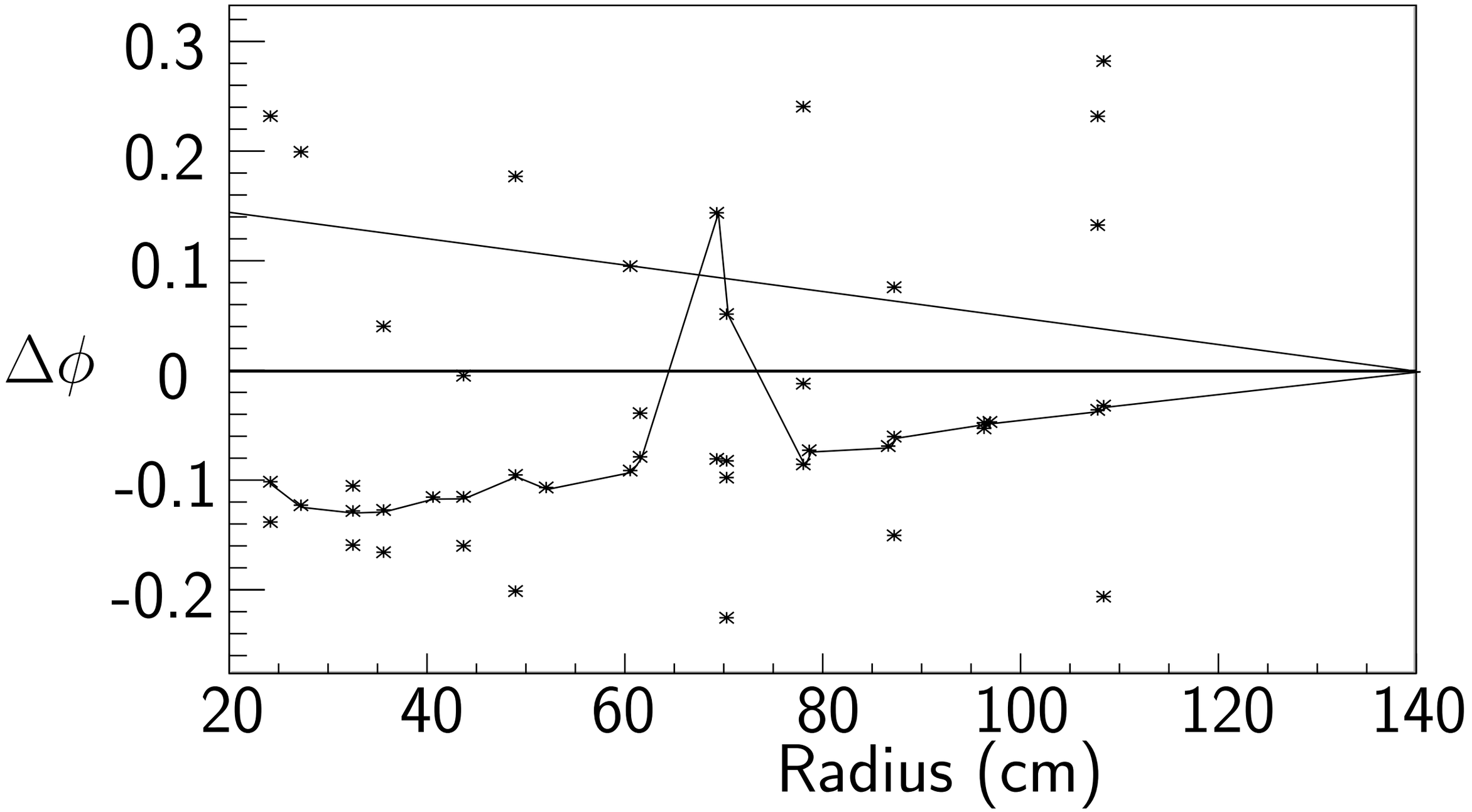
Cloud-forming algorithm:

2. Identify closest hits ("stiletto")



Cloud-forming algorithm:

3. Improve stiletto $\left(\text{here, we minimized} \sum \left|\frac{\partial^2 \phi}{\partial r^2}\right|^2\right)$



People I have come to know

. . . on this project

Andrew Askew
Yuri Gershtein
Colin Jessop

. . . in tracking

Oliver Gutsche
Kevin Burkett