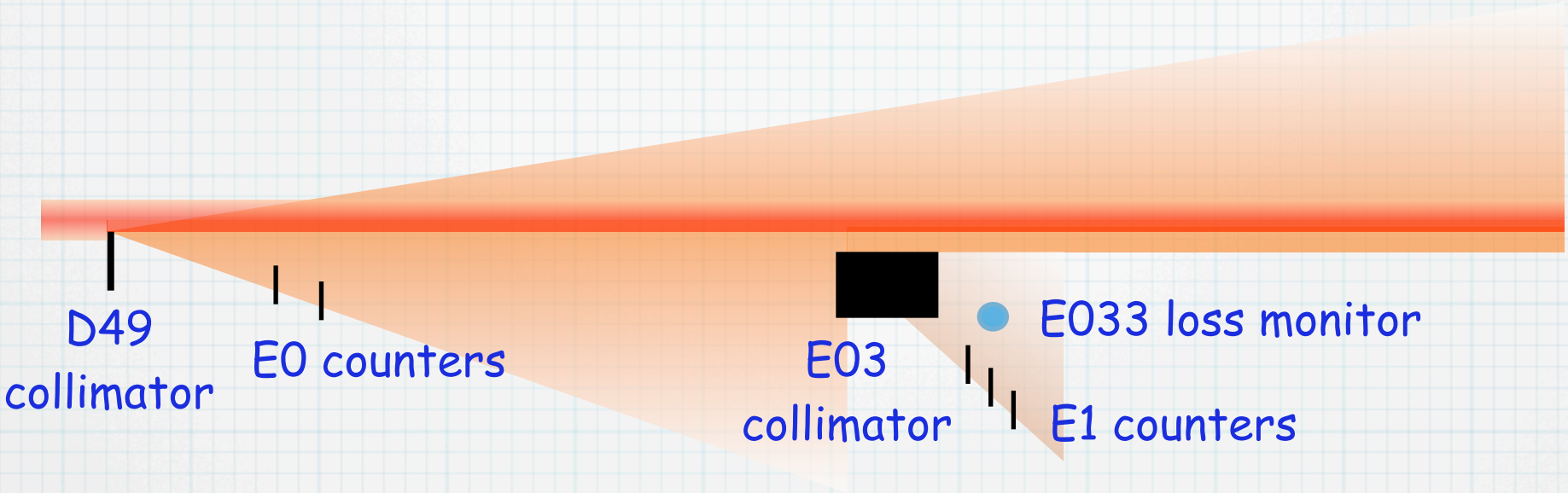
E-Sector Collimators: What are they doing?

R.J. Tesarek
9/17/08

D-E Sector Geometry



My Understanding:

- D49 collimator (target) disrupts beam halo
- E03 collimator (absorber) absorbs disrupted beam
- E0/E1 counters "observe" D49 and E03 collimators

➡ E03 should "shadow" D49 (farther from beam core)

➡ Crystal "replaces" D49 for our tests

Test:

Extact D49 to observe "background rates" in E1 counters for crystal tests

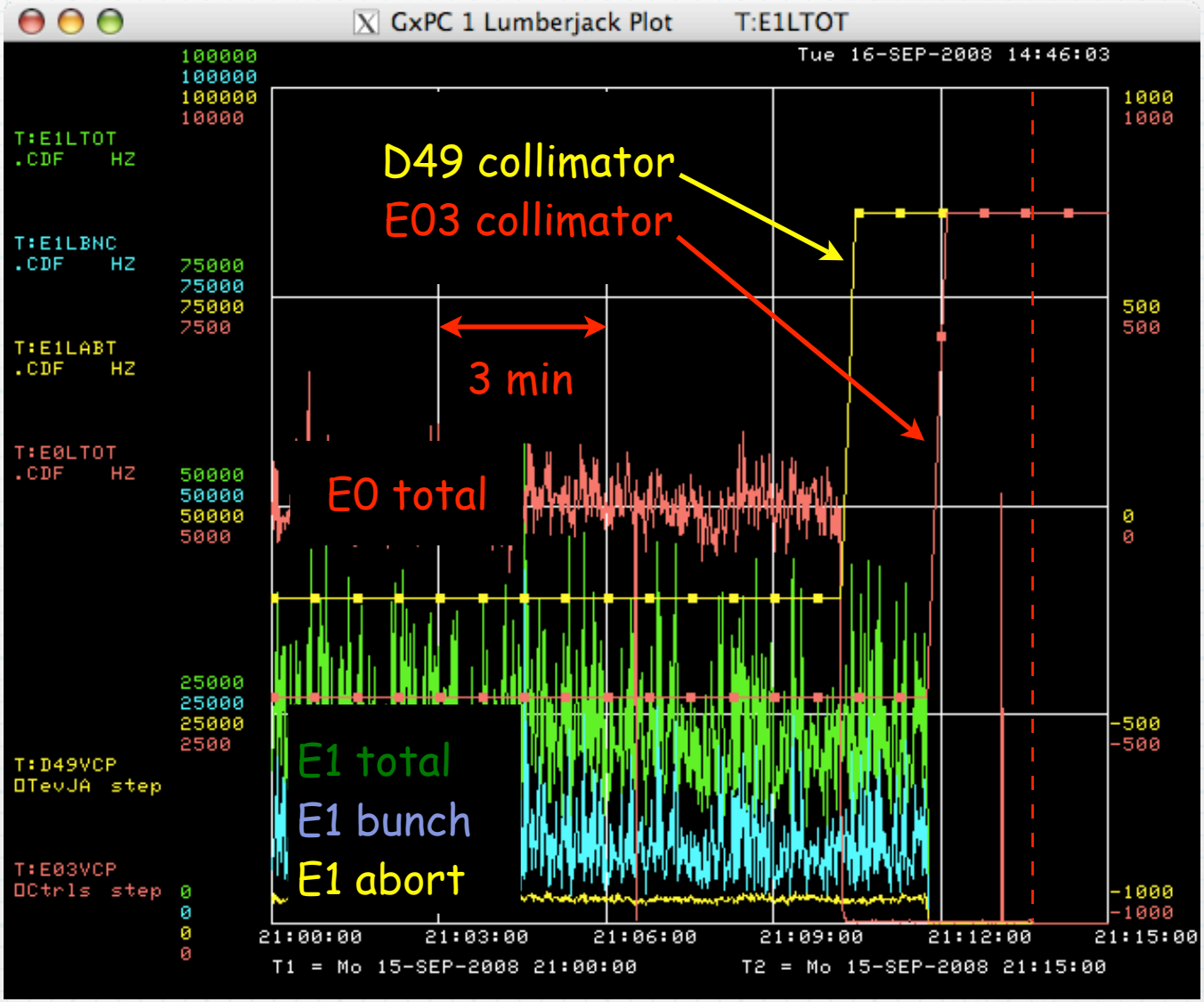
E1 Counter Tests

Retract D49 collimator

E0 rates lower

E1 rates no change

- E1 bunch rates erratic!
- E1 abort rates stable!



What Happens Elsewhere?

Losses CDF

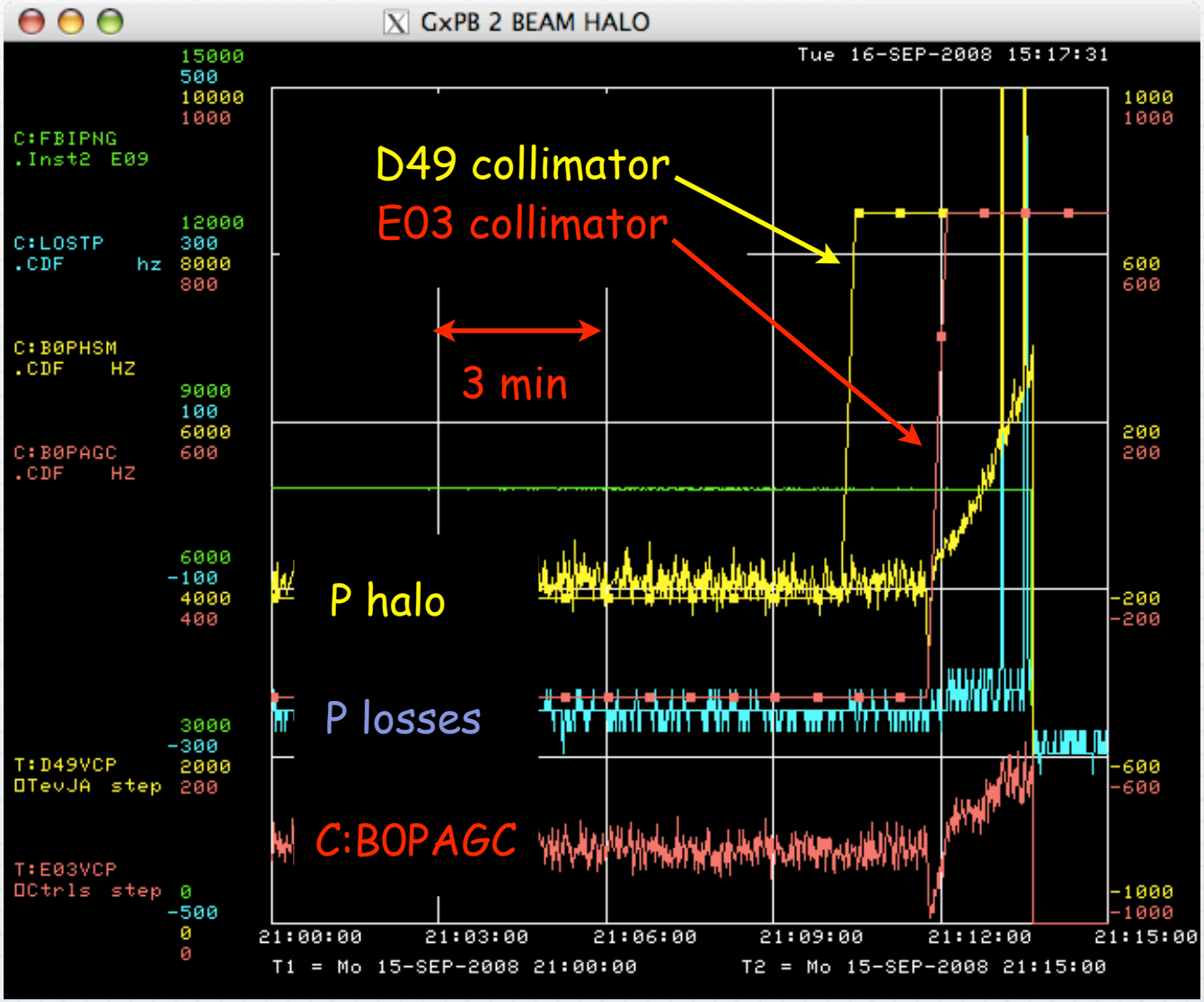
D49 retracted

➡no change

E03 retracted

➡losses change

Similar pattern seen at D0



Crystal Observations

E1 Counters During Study

E1 Total:

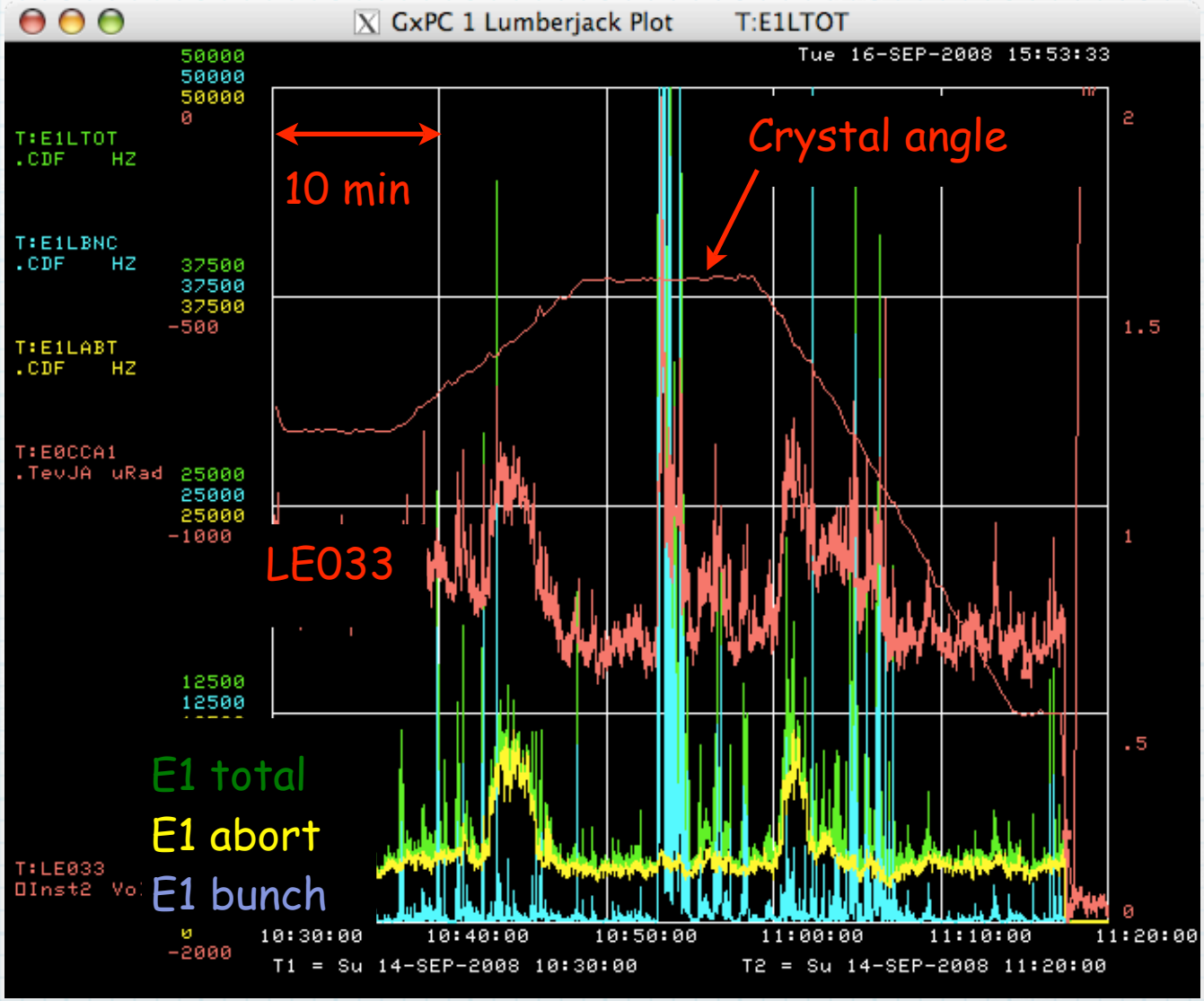
- ➡losses up
- ➡erratic rates

E1 bunch:

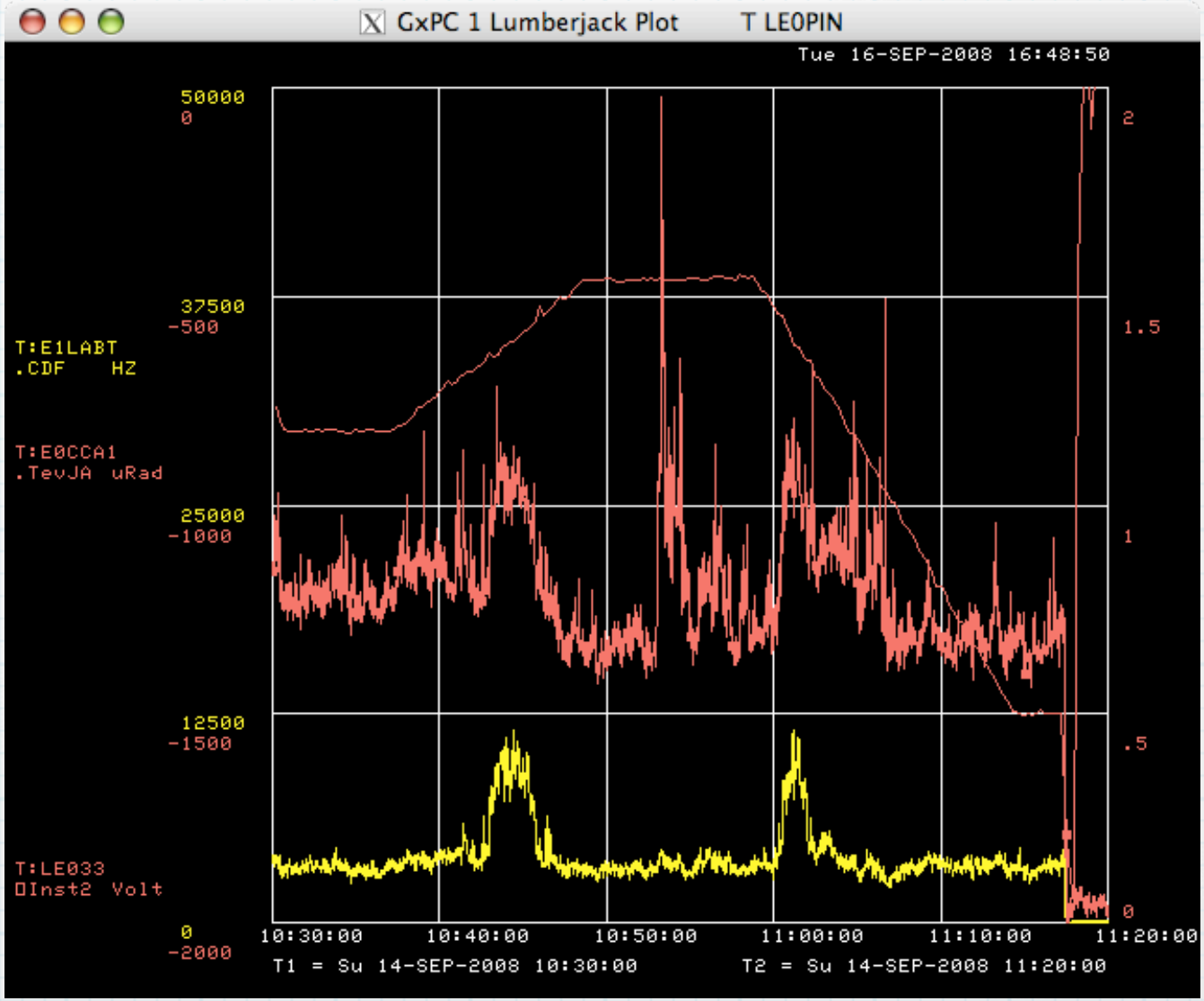
- ➡no change
- ➡erratic rates

E1 abort gap:

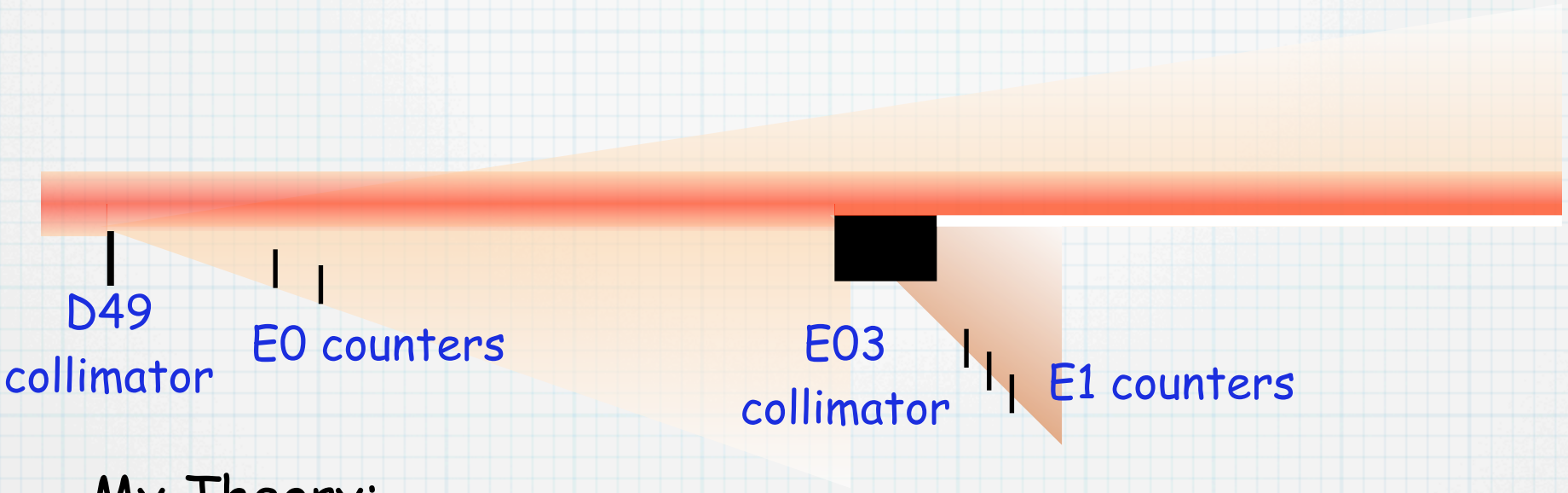
- ➡losses up
- ➡stable rates



Crystal Clear?



What's Happening?



My Theory:

- D49 scraping diffuse halo
- E03 closer to beam core
- TEL kicks beam a lot

Test:

- Retract E03 a little or
- Insert D49 a little

Caveat: I don't know what "a little" means.

Summary/Proposal

Collimators/counters don't work quite as predicted:

- E03 collimator probably in closer than D49 (at end of store)
- End of store study to understand this effect?

Abort gap variables show largest channelling effect (less erratic)

- Gate PIN on abort gap (clean signal?)
  - Problem with timing!
  - May be solved using LRS 621 discriminator and logic unit