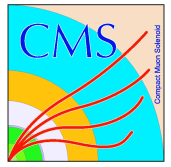


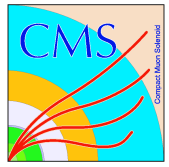
Alignment Status and Plans

Jim Pivarski, Alexei Safonov, Károly Banicz*

Texas A&M University, *FermiLab

27 March, 2008

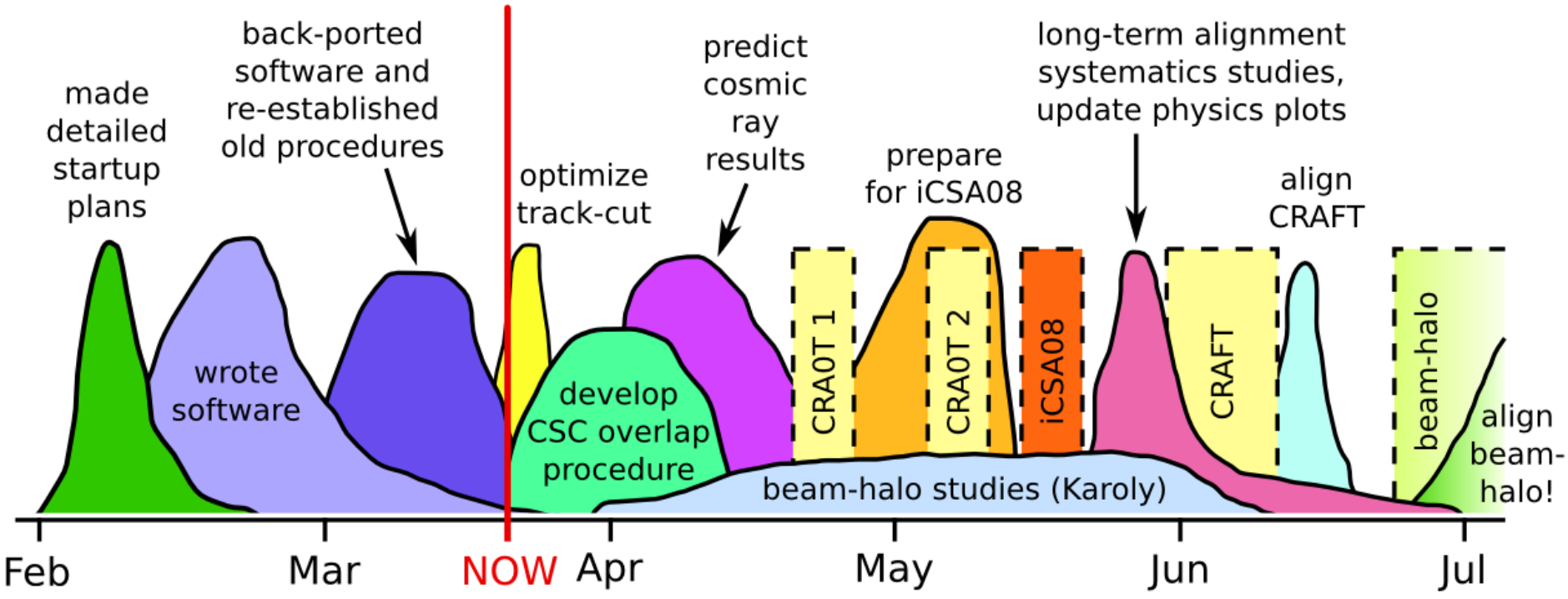
Outline and Scope



- General plan and where we are now
- Timeline in detail
  - Updated software/scripts
  - Track-cut study
  - CSC overlap procedure
  - iCSA08 and pre-CSA08
  - CRA0T/CRAFT and beam-halo
- Database monitoring tools

(∼15-minute talk)

General plan



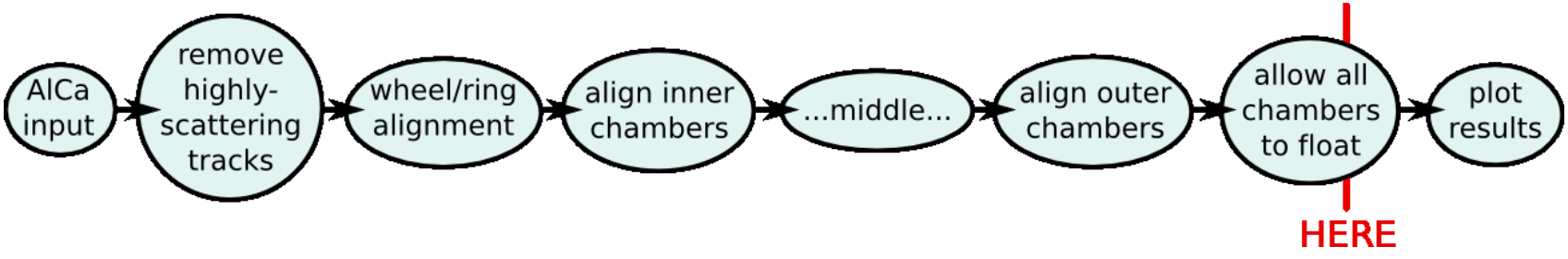
- Done: software preparation and updating old scripts
- This month: incorporate track-cut, develop start-up procedures
- May: iCSA08 preparation and execution
- June: systematics studies, physics plots (POG), and CRAFT
- July: beam-halo, hopefully!

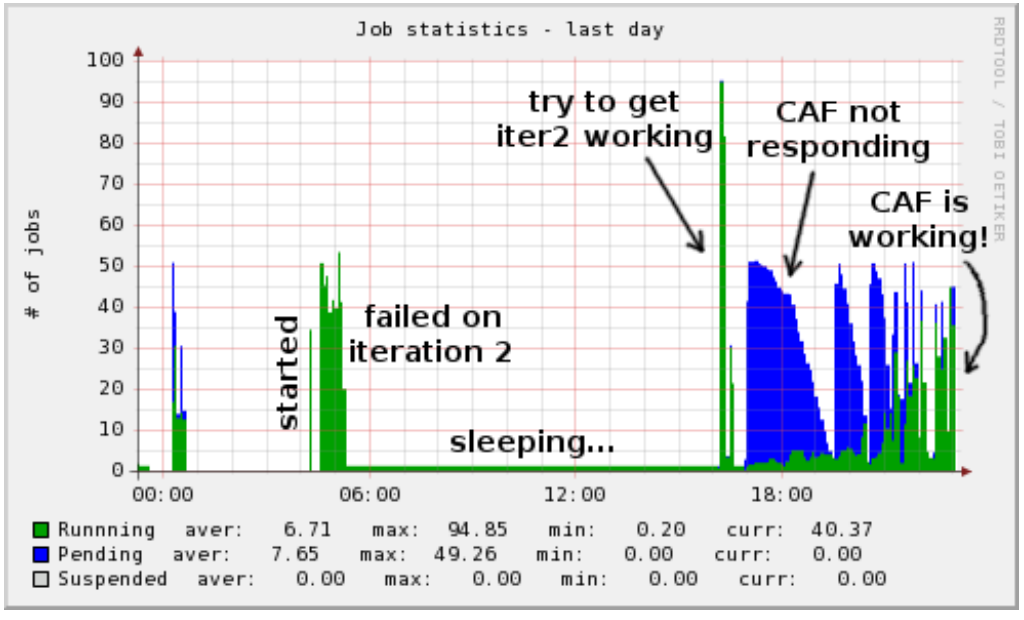
Software and scripts 1

- Developed everything for 2_0_X (on time!)
  - Mostly moving minor tools from private directories to official infrastructure
  - e.g. alignable CSC rings, track cut, APE interface, new plots
  - Also HLT/AlCaRECO paths for beam-halo data stream
- Private 1_6_7 back-port to access old event samples
  - Track-fitting with CSC overlap hits
  - All the new alignment 2_0_X features and interface (to ease transition to real 2_0_X)
- Helped with official 1_8_X back-port, to be used in pre-CSA08 test
  - Will include a special stream with CSC overlap hits

Software and scripts 2

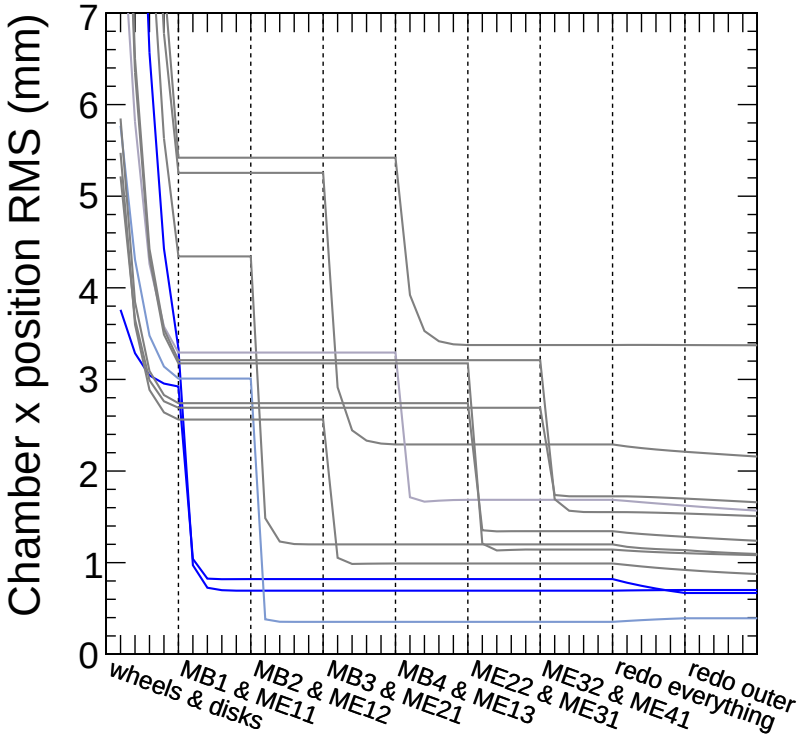
- Updated 100 pb^{-1} alignment script to use new interface
- Applied track-cut, well into automated alignment procedure (after some false starts)



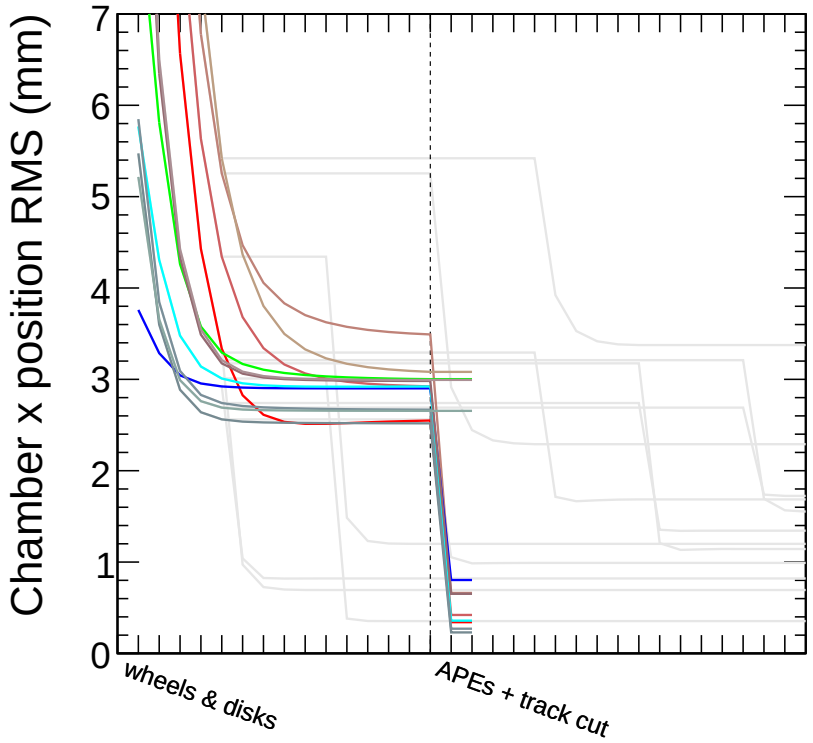


Track-cut study: old results

Baseline procedure w/o cut



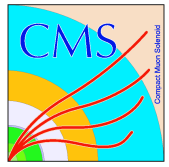
Quick track-cut test



(Each line is a station's resolution as a function of iteration)

- Dramatic improvement in one iteration
- But this is not an apples-to-apples comparison
- Want to do the whole procedure with pre-selected tracks

CSC overlap procedure



- Align CSC chambers relative to each other in each ring
- Originally considered for beam-halo alignment, but it could be just as useful for I.P. tracks (especially low-energy tracks)
- Layer alignment is similar, but doesn't need overlaps
- Event samples:

Overlaps in $W \rightarrow \mu\nu$	1_6_7	re-fit tracks	for developing procedure, can get started soon
Overlaps in beam-halo	1_6_7	re-fit tracks	realistic studies (Karoly)
Overlaps in min-bias μ	1_8_X	pre-iCSA08	realistic studies, iCSA08 prep
Overlaps in soup	2_0_X	iCSA08	realistic studies

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Overlaps in soup	2_0_X	iCSA08	realistic studies

Predicting cosmic ray results

- Baseline procedure with track cut for several chambers
- In time to make a decision about aligning CRA0T
  - Would an alignment without a p_T cut yield interesting results?

Underground cosmics with and without $\vec{B}$	1_6_7	on tape	realistic studies

- It's a timed test and very public
  - Need to get it right the first time!
- Pre-CSA08 provides approximately the same samples in 1_8_X
- Planned muon alignment procedures:
  1. Baseline with high p_T and track cut (test with W sample)
  2. CSC overlap alignment within rings, followed by ring alignment (test with min-bias)
  3. CSC layer alignment (test with min-bias)
  4. CSC beam-halo if it's ready (no 1_8_X test available)

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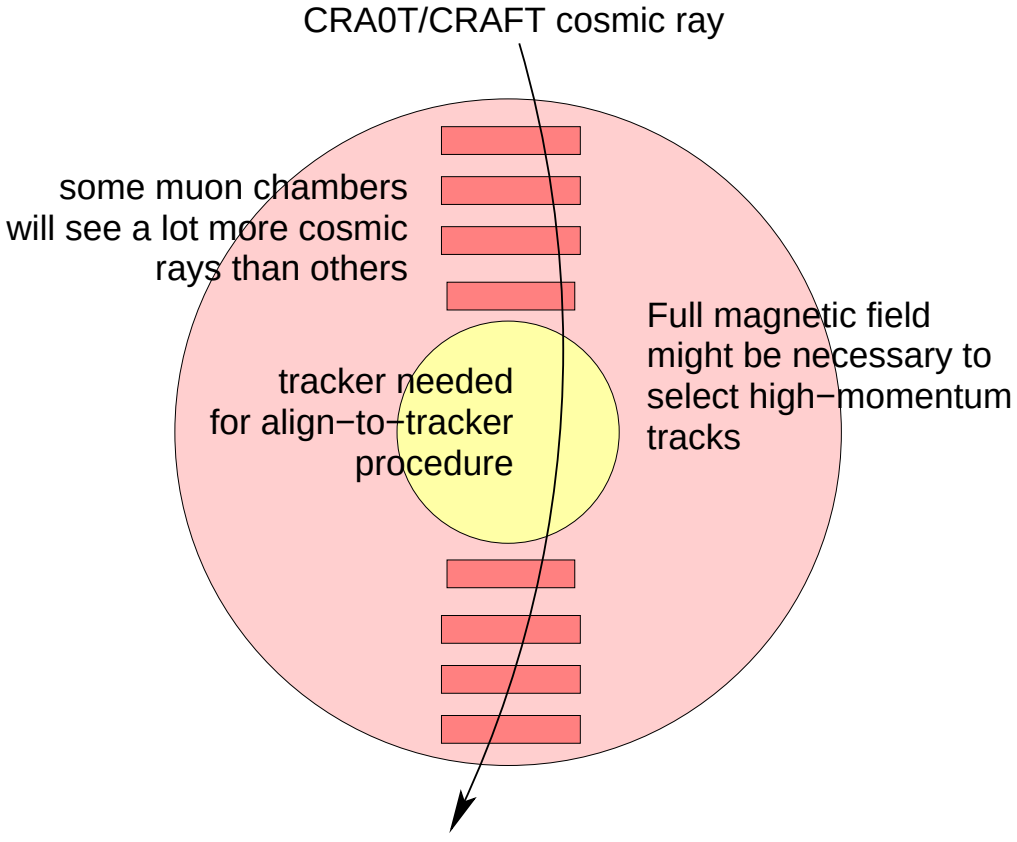
Systematics studies and physics plots

- Repeat of old studies with re-optimized procedure
- Can use 1_6_7 samples, 1_8_X overlaps, and iCSA08 soup

CRAFT (and maybe CRA0T)



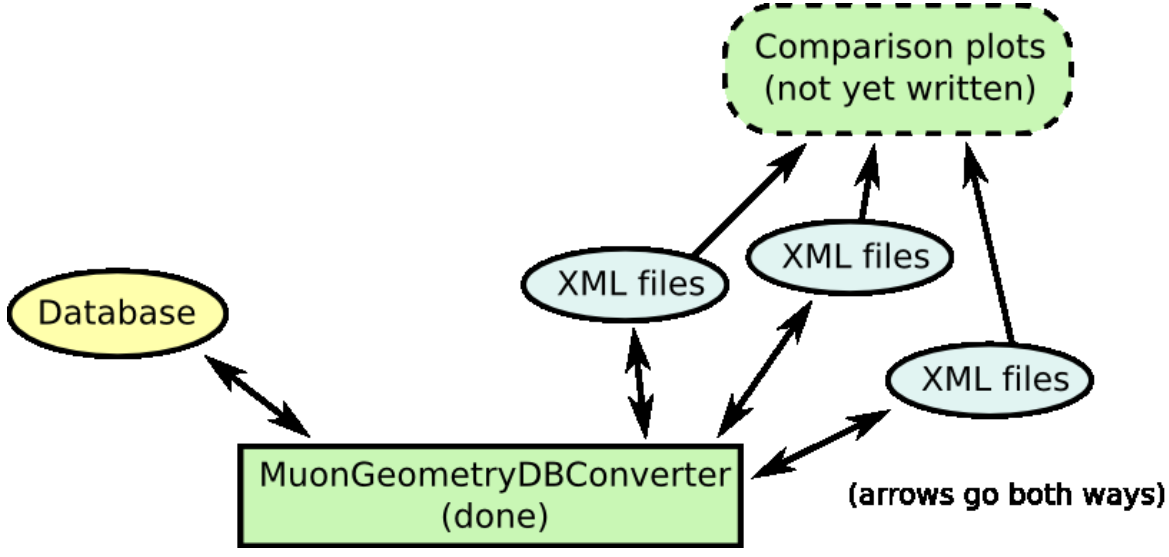
- Baseline procedure on top and bottom chambers
  - in muon barrel (1 million muons through tracker?)
  - possibly as far out as ME1/3 (10k muons?)

Followed soon afterward by CSC beam-halo alignment

- Complete coverage of ring 1, possibly ring 2, but not ME1/3

Database monitoring tools

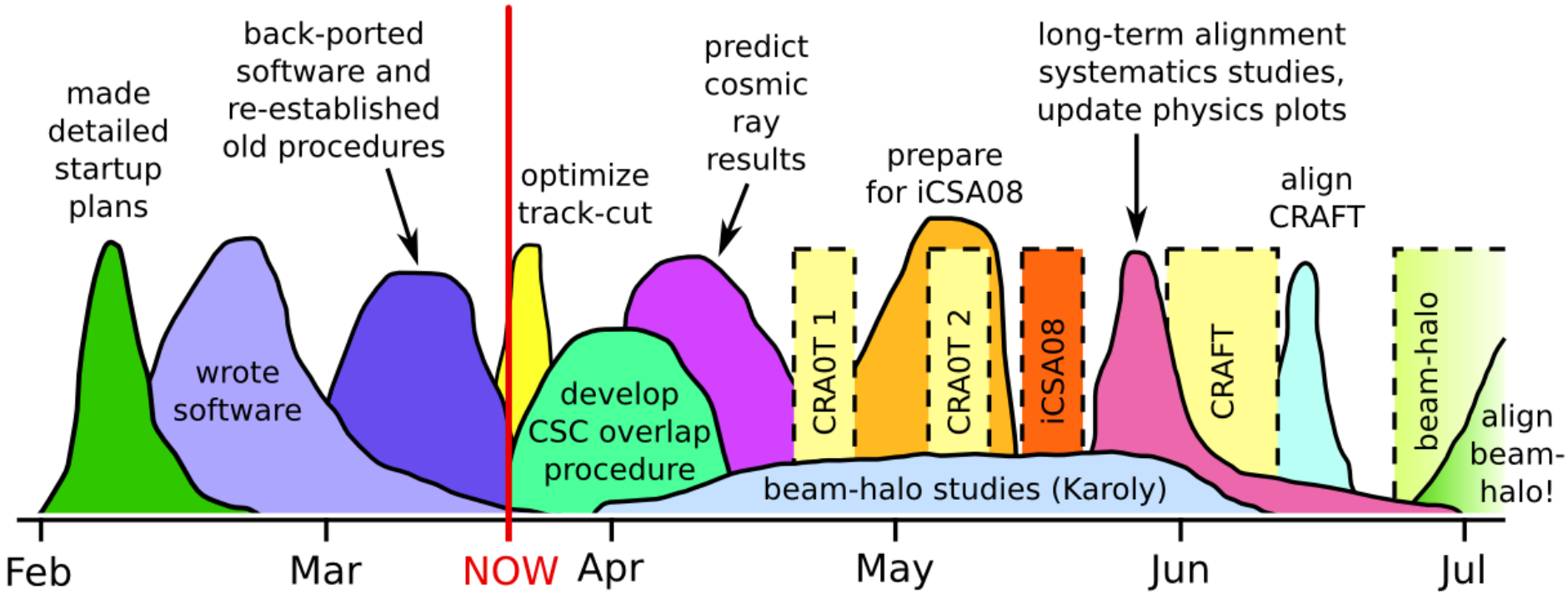
- Motivating problem: CMSSW can't read multiple alignments from the database (with the same IOV) in one job
- Solution: convert database records into intermediary files
- Generalized conversion procedure so that everyone can use it



- Samir is already using this tool to upload DCOPS measurements to the database
- I'm writing comparison plots on an as-needed basis

Conclusions

- Mostly about scheduling, so I'll re-draw the timeline



- No time devoted exclusively to comparison-plot development
  - Can be split into a separate project, if there is someone who would like to work on it
  - Groundwork has been laid, scope is well-defined