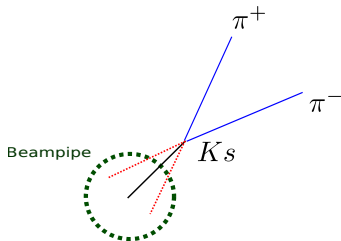# V0-finder status report

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v0finder

- **reconDecay** (current method): tracks pions back onto IP. Shift to higher Ks masses due to wrong pion Energy: $E_W + \frac{dE}{dx}$
- **v0finder**: promises unbiased Ks mass, since pions are not tracked back until IP: E_W. Thus we expect better reconstrcution efficiency and vertex resolution.(performs **RAVEVertexFit** during reconstruction without saving results, later additional **KFit** when creating the particle list.)
- **inside beampipe:** the two results should be *the same.*

The Problem

Ks reconstruction over radius
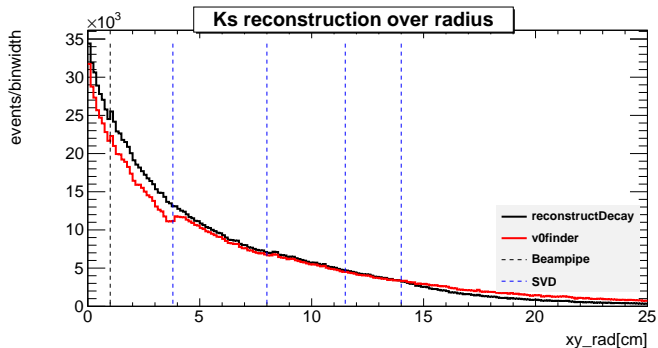
- $\approx 2\%$ **of K get lost** inside beampipe and until first SVD layer.
  (1 million $B \rightarrow KsKsKs$ with MCMatching)

Potential error sources

1. decay too complex. V0 has problems with 6π per event...
   - generated 1mil single Ks with **particleGun** $\rightarrow$ no solution
2. hidden cuts.
3. RAVE fails.
4. KFit can not handle RAVE info (v0-infastructure problem).

During this process some very general and conseptual questions emerged

Cuts

inside V0-module:

- $\chi^2 < 50$ cut on vertex quality
- cut on Extrapolation to cylinder: *"This is intended to reject tracks that curl away before meeting"*
- cut on V0 mass inside beampipe $r < 1cm$: $60MeV$ mass window

at analysis stage:

- $400MeV$ mass window at FillParticleList (before KFit)
- $40MeV$ mass window after KFit

Ideas:

- take out all cuts for validation and debugging
- rethink the whole concept of cuts:
  - wich ones are really useful and should be set as default?
  - mass cut should be dependend on radius

RAVE VertexFitter

- Isolated RAVE information to check if it causes the Ks-loss:
  still losing Ks so probably there is an issue with RAVE
- need MCMatching to count Ks:
  encountered ISSUE: There are two different V0 Matcher in Basf2!

Ideas:

- Develope homogenous concept for Matching. Do we really need to Match at reconstruction stage?
- Use MCTrackFinding and force Decay $Ks \rightarrow \pi^+\pi^-$ to not be dependend on MCMatching.
- Maybe even more interesting: Are there events with 2 Tracks that still fail to produce V0?