

# Offline Tasks and Service Work DRAFT

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# HPS Reconstruction



## Hits

### hit fitting

#### hit pre-selections

APV x-talk filtering

pileup rejection

#### baseline determination

online (from calibration runs)

offline (from pre-samples)

#### pulse fitting (amplitude, time)

shape parameters

fit technique

single vs. multi-pulse

estimate optimization

### hit clustering

thresholds

time consistency

### spacepoint determination

position estimation

time estimation

## Calibrations

baselines (pedestals)

noise

hit time

position resolution

## Tracks

### seeding

seedtracker

KF

### fitting

GBL

KF

including time?

## Calibrations

position (alignment)

GBL

KF

time

## Reconstructed Particles

### track selection

chi-squared

hit content

track parameters

### cluster matching

position

time

energy

### hodoscope matching

position

time

### parameter estimation

Track parameters

ECal time constraint

ECal energy constraint

## Calibrations

### ECal

energy (including edges)

time

position (alignment)

### Hodoscope

time

position (alignment)

completed (to first order)

underway

in critical need of work

# Draft Plan for Student Effort



1. Alic - Thesis: SIMP search of 2016 data, Service: 2019, 2021 track-cluster matching calibration, SVT calibration, tracking improvements
  - Track-ECal Cluster matching (completed)
  - SVT pulse fitting improvements and calibrations (completed)
  - Help with checking KF tracking on 2016 data by comparing to ST/GBL
  - Study Møllers with KF tracks
  - Reach estimates for SIMPs (underway)
  - 2016 SIMP search result
2. Tom - Thesis: iDM search of 2016 data, Service: alignment and tracking improvements
  - Debug KF alignment code and add some monitoring plots
  - Help with checking KF tracking on 2016 data by comparing to ST/GBL
  - Help get KF alignment working on 2019/2021 data
  - Fix phase space cut out in tritrig MC
  - Get iDM MC generation going and make reach estimate for at least 2016
  - iDM search strategy and reach
  - 2016 iDM search result
3. Rory - Thesis: SIMP and iDM searches of 2019/2021 data?, Service: svt hit formation
  - SVT pulse fitting analysis and improvements
  - SVT clustering algorithm analysis and improvements
  - SVT time calibration and integration of time into track finding and fitting
  - Help with validation of reconstruction of 2019/2020 data
  - 2019/2021 SIMP and iDM search results?
4. Emrys - Thesis: prompt A' search on 2019/2021 data? Service: combining track and ECal/hodo information
  - Develop track-cluster and track-hodoscope matching selections
  - Develop improved event selection (improve/understand rad fraction)
  - Study Mollers in 2021 data (improve/understand global alignment and mass resolution)
  - Incorporate ECal energy measurement into e+/e- momentum estimate (improve mass resolution)
  - 2019/2021 A' search result - prompt
5. Sarah - Thesis: A' displaced search on 2019/2021 data?, Service: Monte Carlo improvements
  - Alignment studies with MC
  - Characterization of SVT performance, including Data/MC comparison
  - Improvements to how we take into account efficiency issues
  - Development of search strategy (thinking in the direction of more generic search over full available phase space with model specific interpretations of that result)
  - 2019/2021 A' search result - displaced