

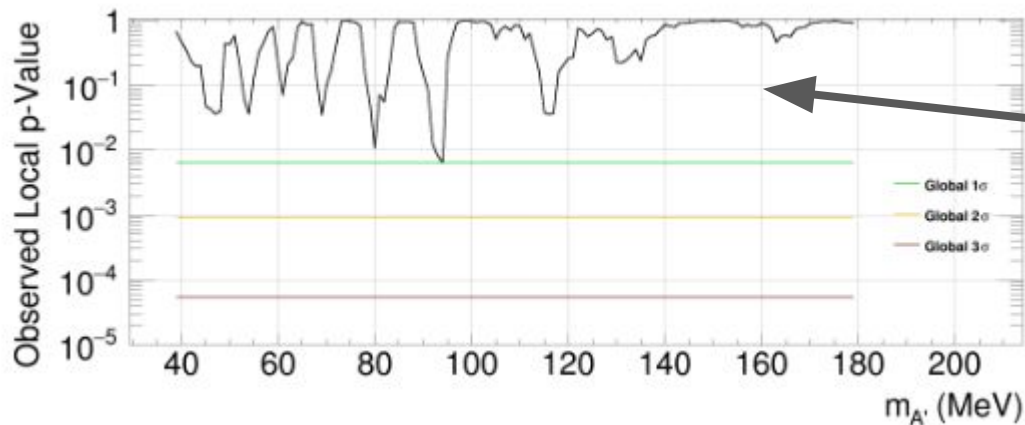
Status of 2016 Publication (and some words on 2019-2021)

Matt Graham, SLAC
HPS Collab Meeting
November 16, 2021

Documentation for 2016 Analyses

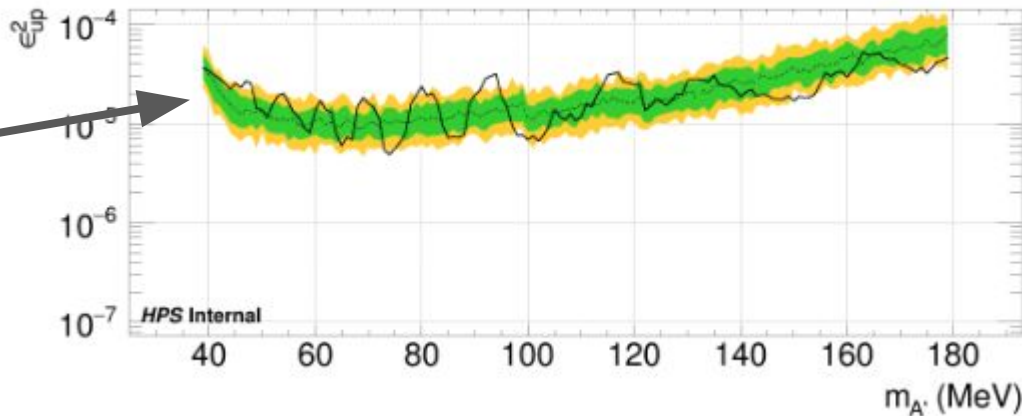
- Bump-hunt 2016
 - Analysis Note on [Confluence](#)
- Vertexing 2016
 - I showed the final results, with systematics, at June'21 CM
 - [Vertexing 16 Collab Talk](#) (June 25)
 - Analysis Note on [Confluence](#) and [Overleaf](#) (ask me for permission if you want)
- Combined PRD (draft)
 - [Confluence](#) (PDF as of aug 13)
 - [Overleaf](#)

Final bump-hunt results with systematics



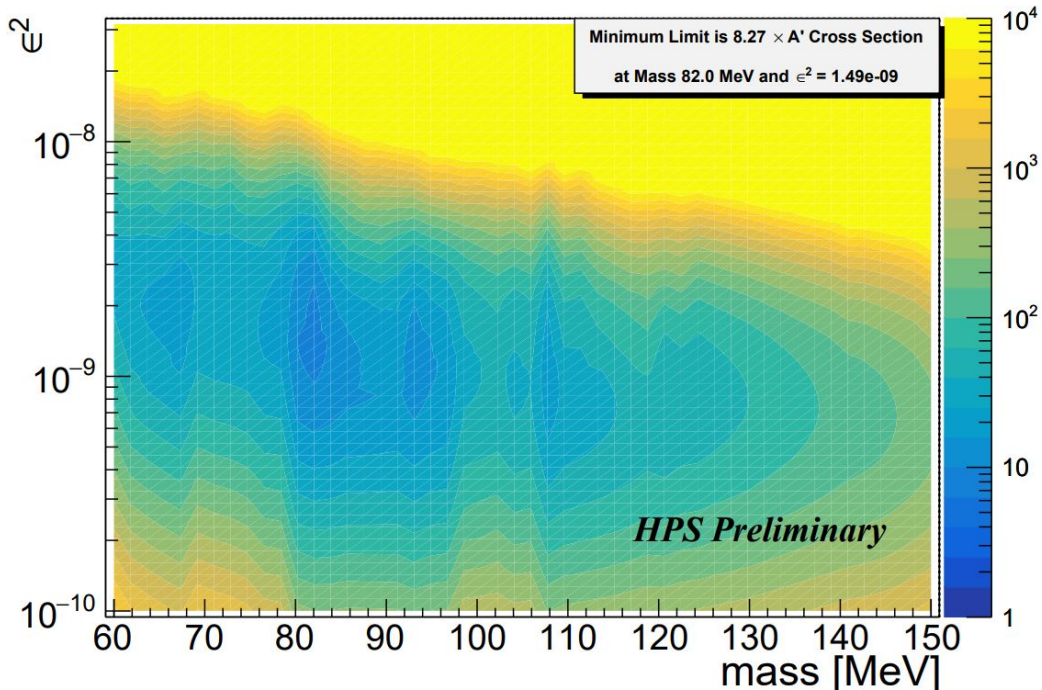
Local p-value

Observed 90% Limit

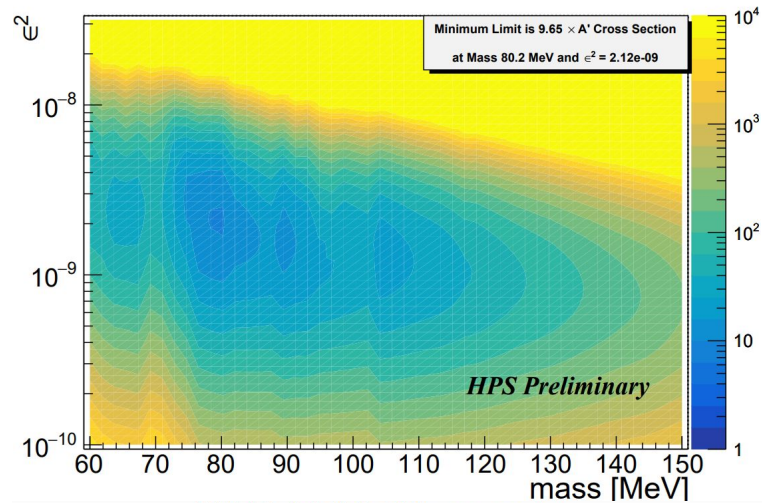


Final vertexing results with systematics

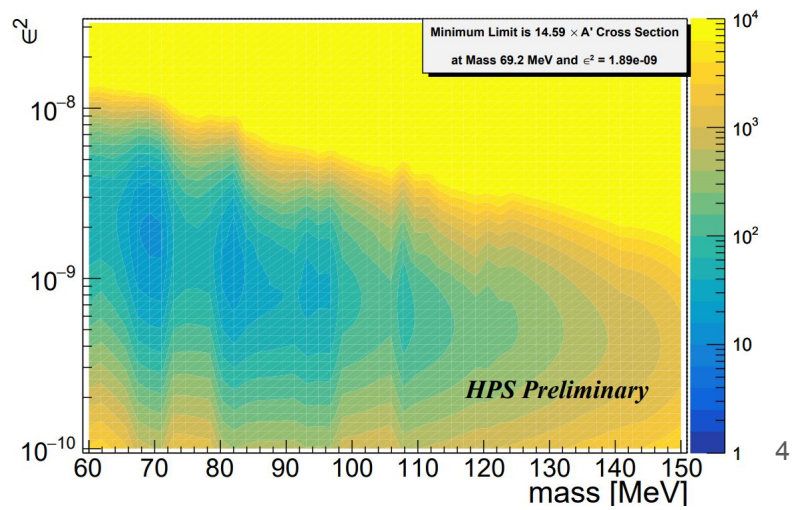
OIM Scaled Limit L1L1 L1L2 Combined 100 percent data



OIM Limit L1L1 100 percent data



OIM Limit L1L2 100 percent data



Vertexing 2016 RC meeting Nov. 9, 2021

[Confluence Page For Meeting](#)

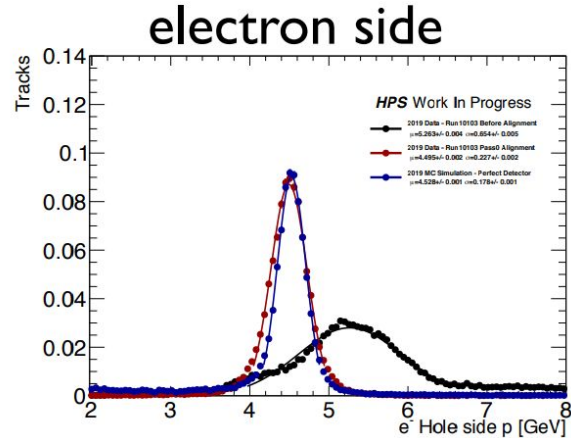
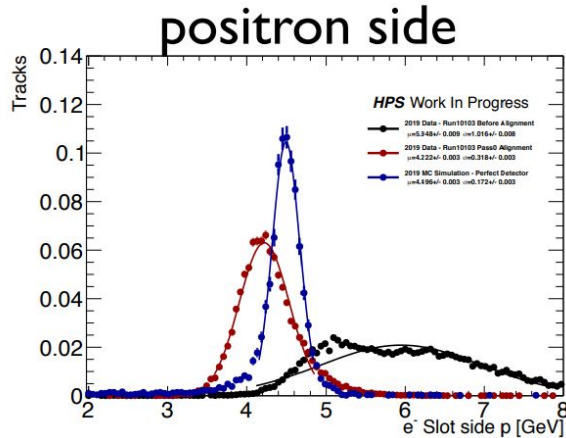
- I showed the final results, with systematics, at June'21 CM
 - [Vertexing 16 Collab Talk](#) (June 25)
 - We received comments from RC on note on July 22
 - Responded to comments & updated note Aug 8
 - ...then the data run took priority for everyone...
- One issue that seems unclear is exactly what our “final result” of the analysis is considering we can't set a limit on the nominal A' production with the 2016 data set
 - this has been much discussed in the past and decided that we produce an upper limit on the multiple of nominal A' production rate vs mass & coupling.
 - This type of plot has been shown lots of times for 2015 results and 2016 projections
 - We may also want to include in pub the number of “detectable” A' events (nominal produced \times acceptance \times efficiency) and the limit on the number of detected events ... up for discussion
- Another complaint is that the analysis note is hard to follow
 - Analysts would like some specific suggestions on how to improve note
 - This note is not a public document. Primary audience is for future vertex analysts
- We'd like to get the analysis results signed-off on ASAP so that we can finish up PRD draft

See Andrea's talk right after mine for the post-meeting plan

Combined 2016 Paper Status

- Paper committee is MG, Jaros, Rafo, Rouven, PF, Cam, Solt, Omar
 - See link to PDF/overleaf on slide 2
- There is a lot of content there but a lot that needs to be added, rearranged, and updated (vertexing, mostly)
 - Some sections missing (SVT/tracking/vertexing/MC) and the “flow” isn’t very good at this point
- Paper committee should meet in the near future to discuss how to attack
 - After Vertexing has plan for analysis sign-off...meeting post-thanksgiving?

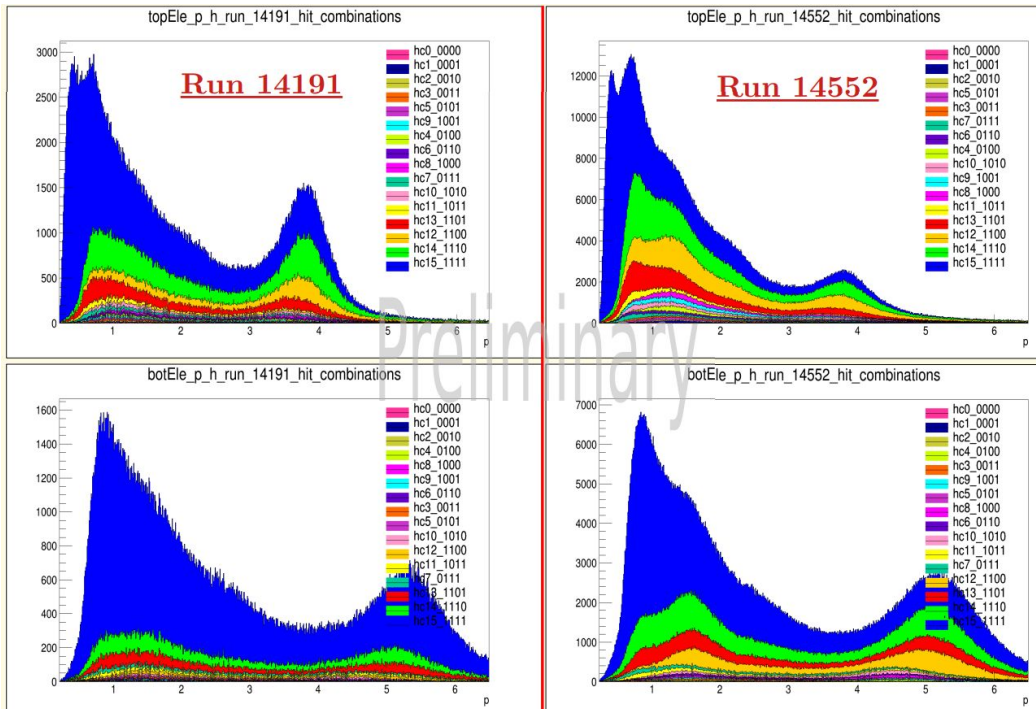
2019 Data Analysis



Blue -- MC
Red -- current alignment

- The 2019 data still isn't quite ready for full*** analysis
 - For me, the alignment (particularly how it manifests in the momentum scale/resolution) is the biggest blocker
 - See above, but I thought there was a more striking difference in top/bottom scales?
- Asterisks: we should be analyzing this data even now...identifying and differences in runs, exercising code, etc
 - Now that 2021 run is over and vertexing is getting there, I plan on focusing on 2019 hit/track efficiencies

2021 Data Analysis



The 2021 data already looks pretty great

- PF did a 0th alignment pass very early on and the top looks pretty great...bottom less so
- Definitely some changes to conditions during the run period so we need to be careful
- Alignment and calibration on this data set should start now (and has already started)

The plan ahead!?!

- Given where the understanding of the 2019 and 2021 datasets are, I am heavily favor analyzing these data sets together
 - I think this will be the most efficient use of our limited manpower and these sets are really not that different
 - We need more people doing data analysis...there are lots of tasks!
- I think we should make another push on the random-trigger-overlaid MC
 - Great way to get the real background conditions into the MC; still need to understand how many conditions we need to use for signal
 - Tongtong set up framework and ECal/Hodo response and I added some code to make it work with SVT though this hasn't been tested extensively
- I'm trying to organize an alignment get-together with SVT folks to:
 - get everyone understanding the process PF is using
 - brainstorm about how to approach the issues we are seeing
 - get more/the next people involved in alignment