

HMS Gas Cerenkov Spring 2018

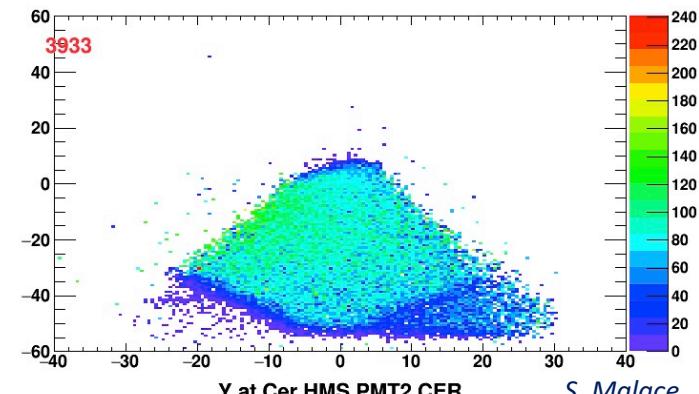
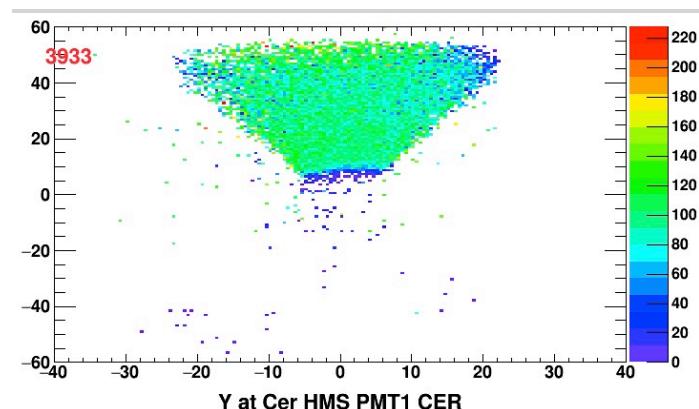
...how can we recover the loss
of signal near the corners of
acceptance?

...is it real?

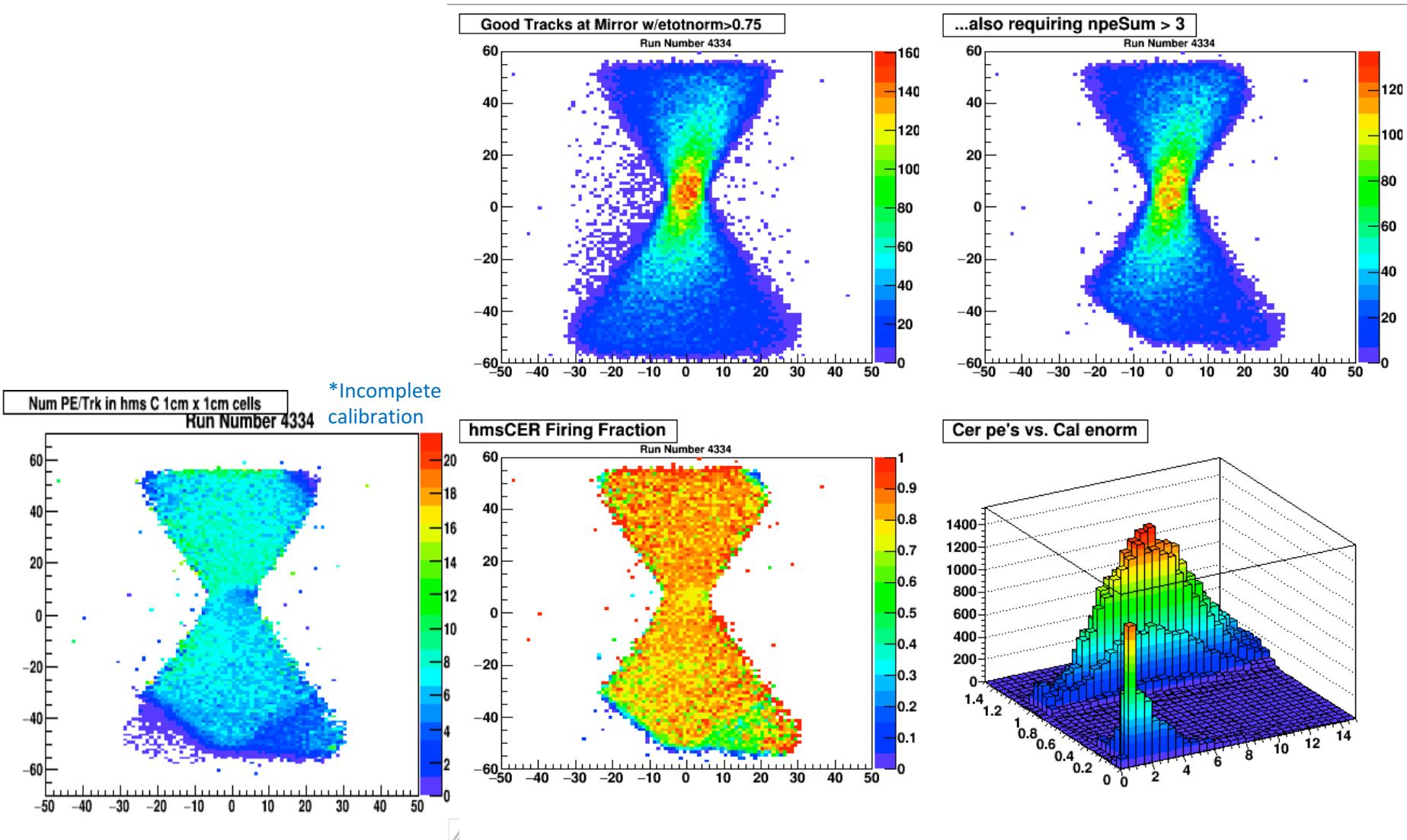
...what caused it?

Howard Fenker

Monday, June 4, 2018



Confirmed by Independent analysis (and learning how to use ROOT)...



What did it look like in the past?

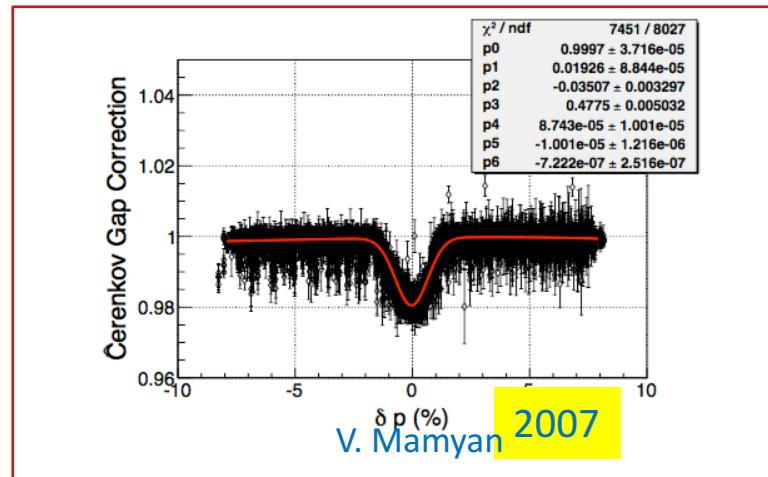
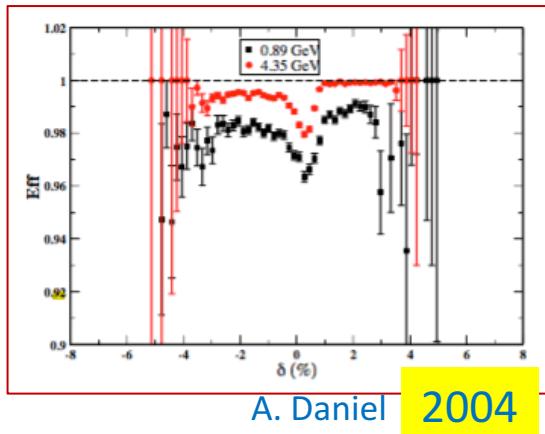
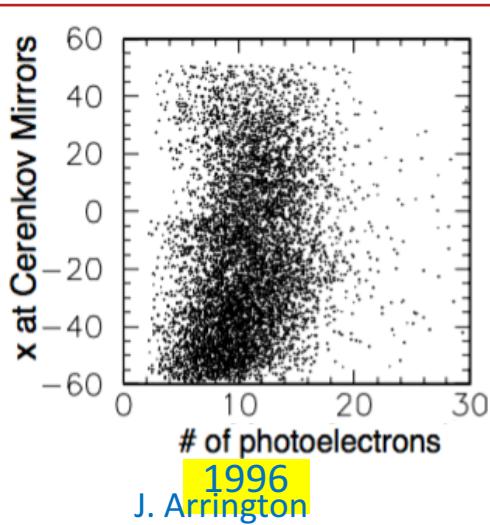
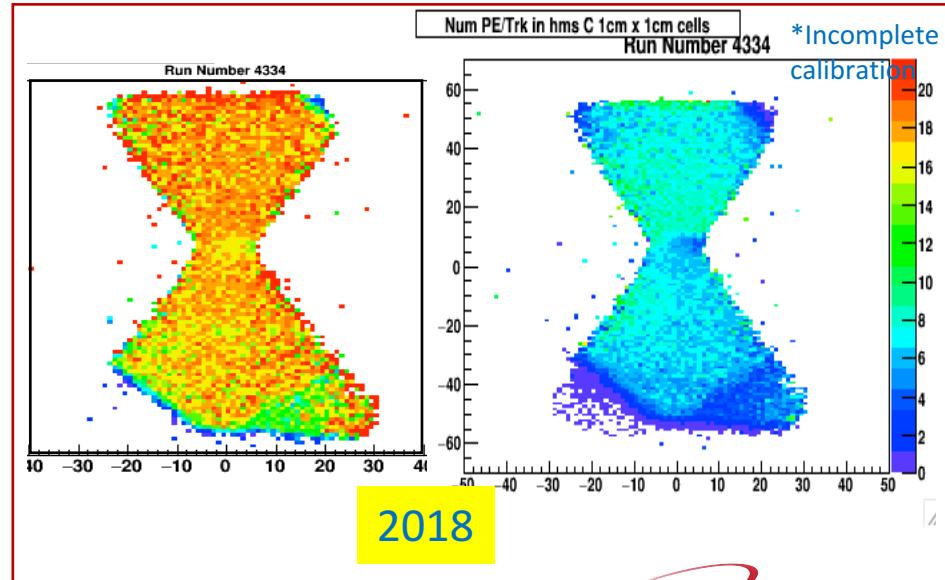
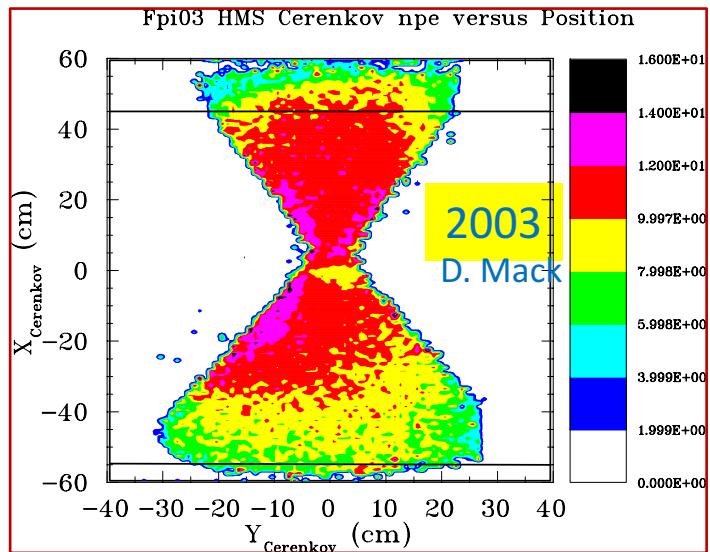
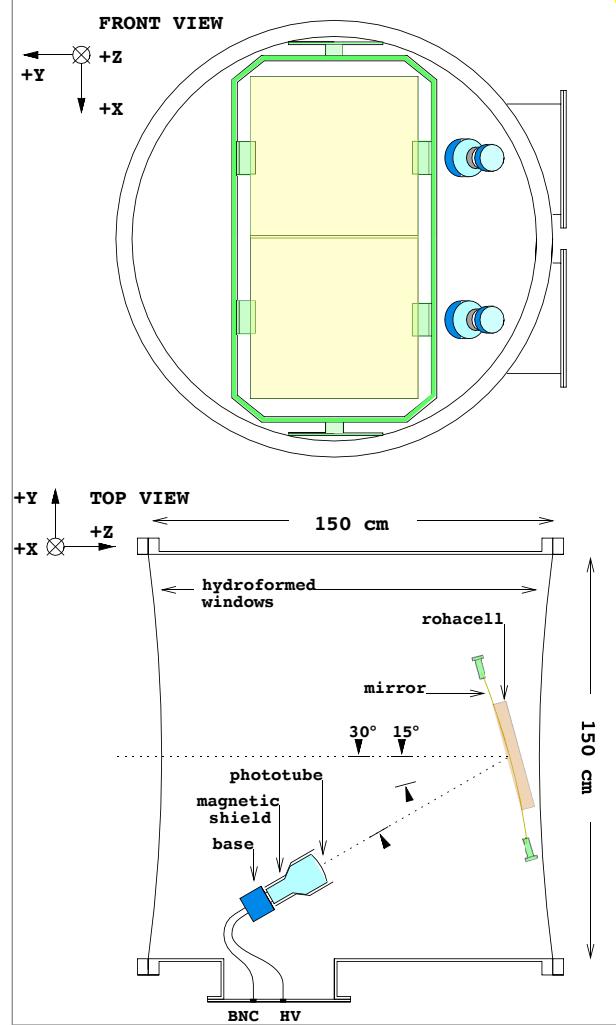


Figure 28: Inefficiency of the central part of the Čerenkov due to a gap between the mirrors. Inefficiency is parameterized in δp and applied to all cross sections on bin-by-bin basis. All production runs are used to calculate the inefficiency.

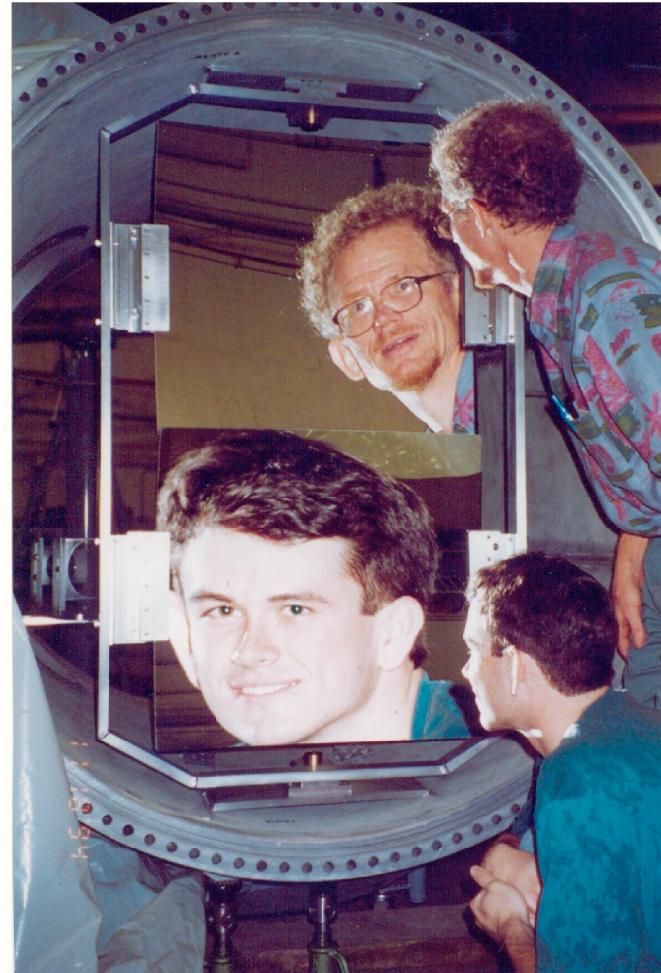


HMS Cerenkov Design

Mirrors etc.



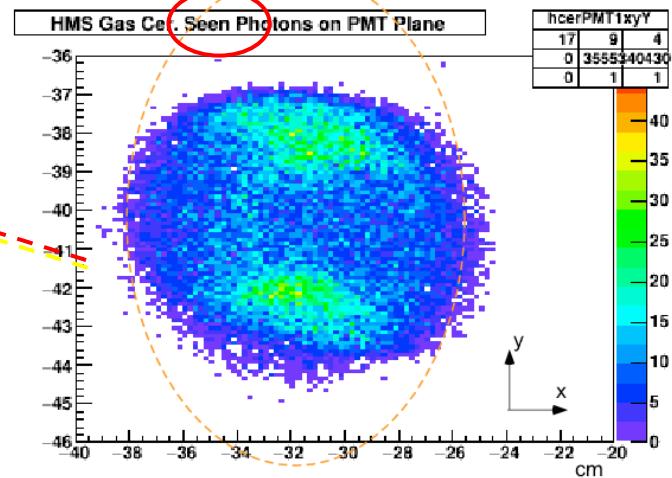
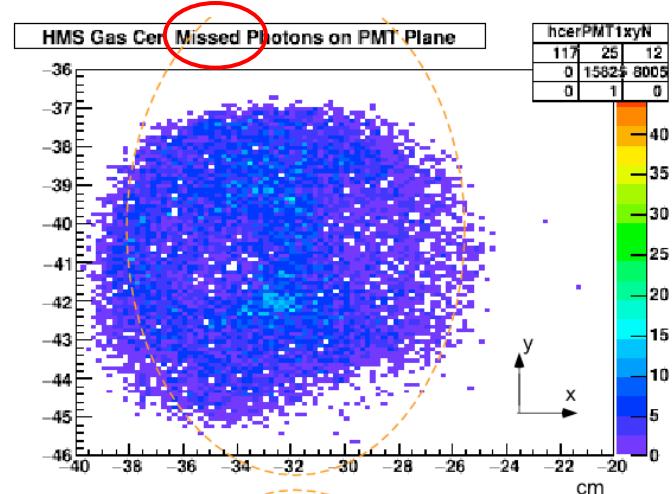
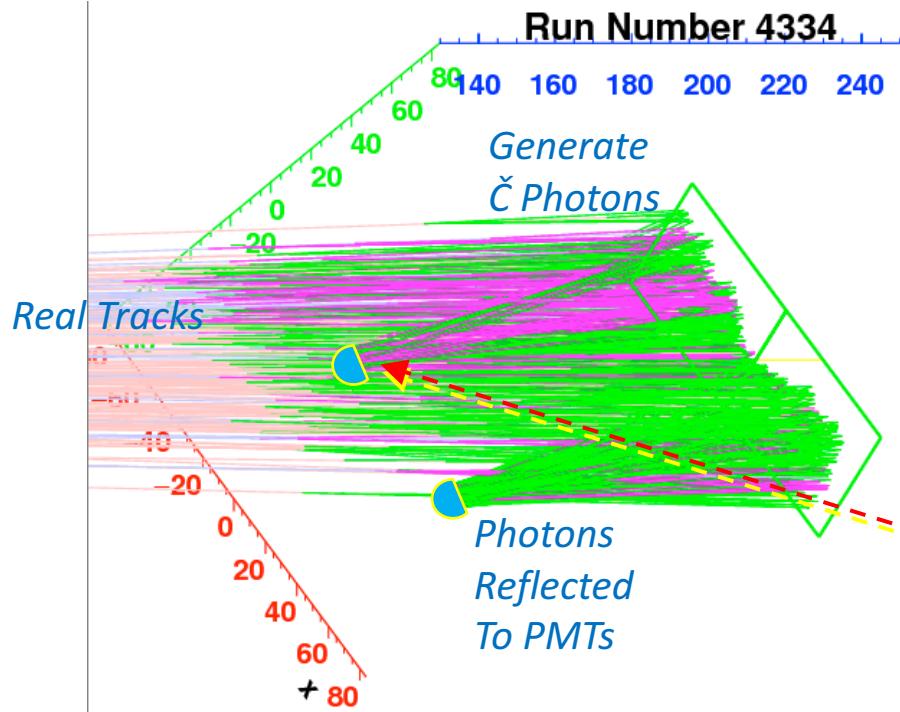
R = 163 cm, 3mm, 65 by 60 cm from
CERN, backed by Rohacell for stiffness



Simulate the Optics

Can I generate the observed inefficiency pattern by misaligning a mirror or PMT?

..... “NO!”



So, what's going on?



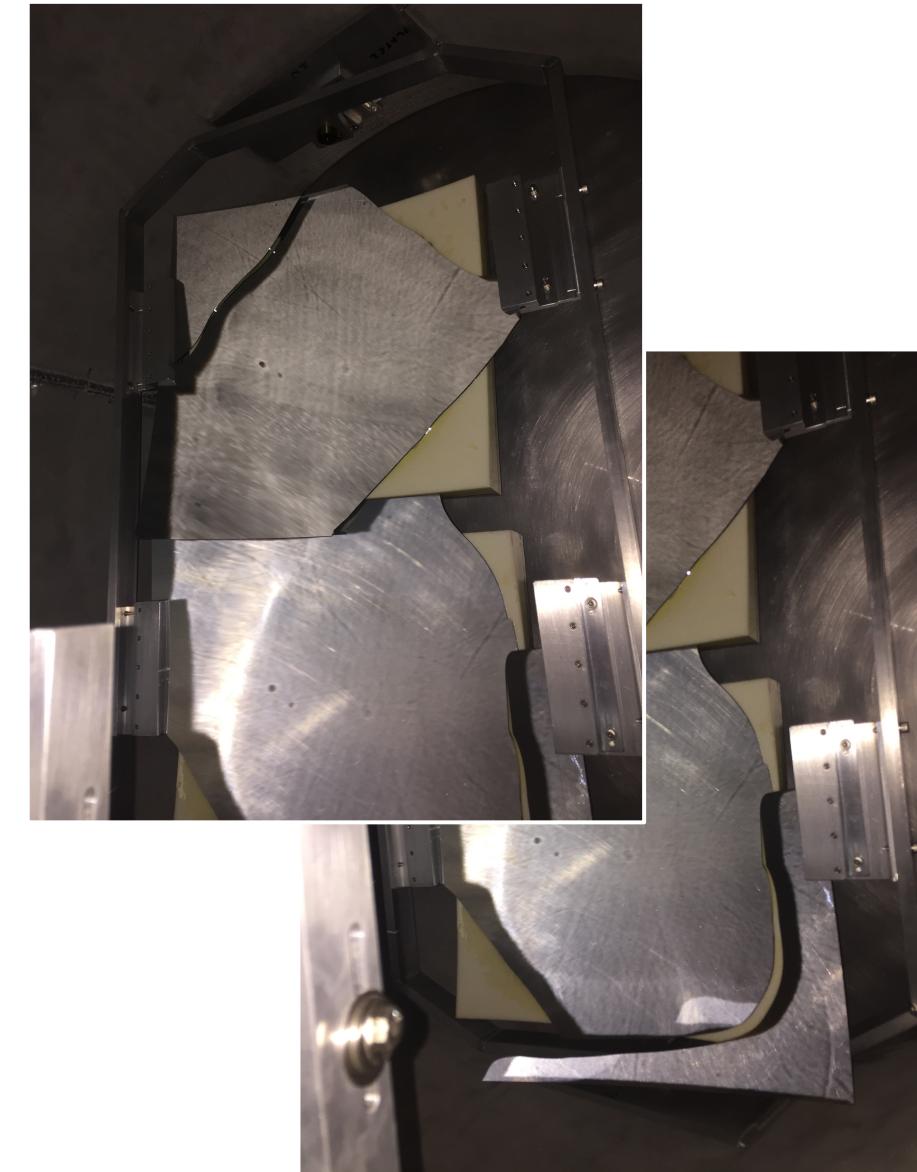
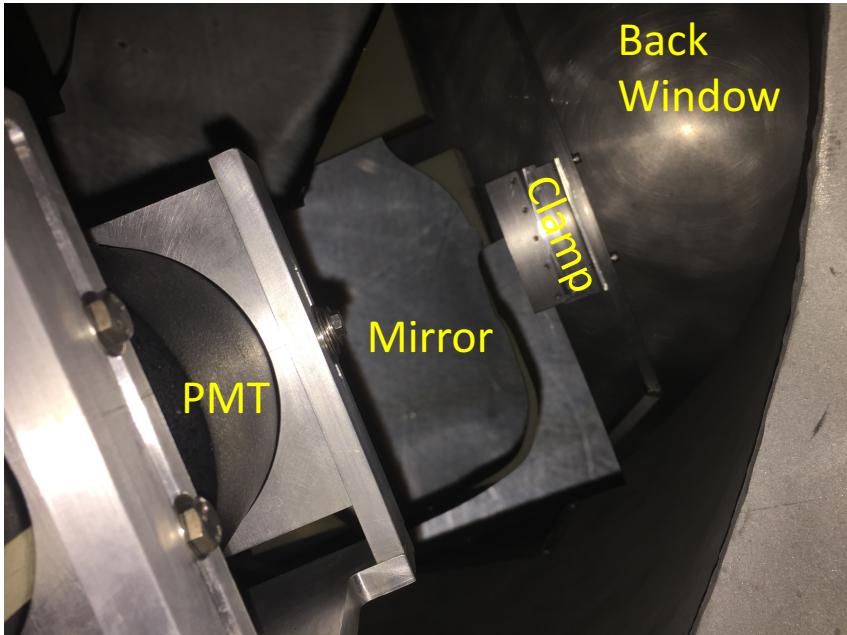
With help of
ESH&Q



Remove C4F8O

And look inside...

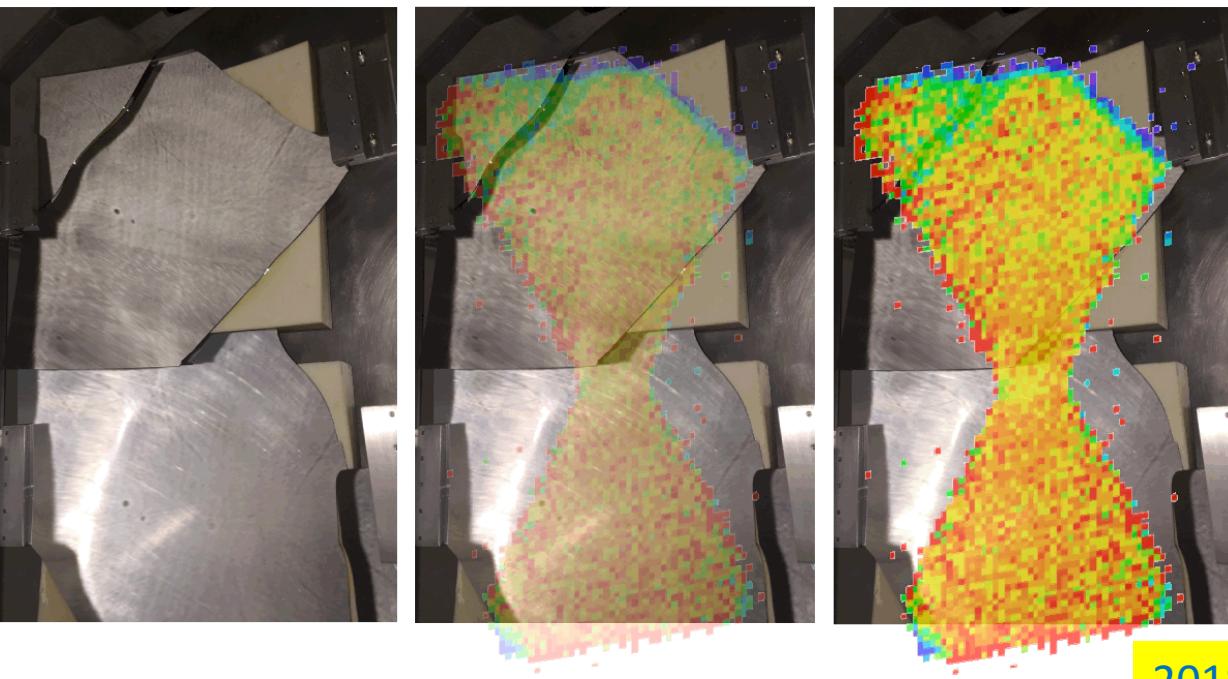
\$#%@ ?!!!!



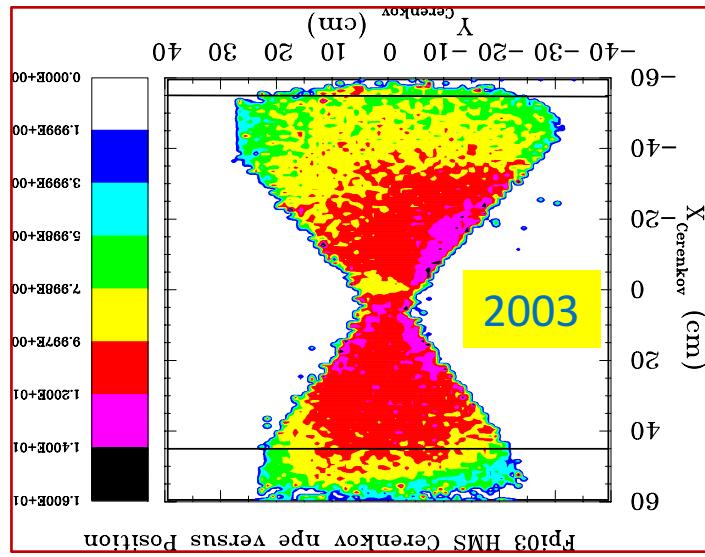
"We need a plan."

D. Day 6/1/18

Have we really been taking data that way, or did the mirrors just break after the “Spring-18 Run”?



2018



Certainly the mirrors were broken during the (end of) “Spring 18”, at least. They may have been broken (breaking?) for a very long time.

Path forward

- We have two spare mirrors: one at JLab and one at UVa.
- Techs are preparing to remove Cerenkov from the HMS.
 - Gently so that we can possibly learn what made mirrors break.
- Place on floor of Hall C
- Set up workspace
 - Remove front and back windows.
 - Attach/install new mirrors. Fix mounts as needed.
 - Perform optical alignment.
 - Reattach front/back windows & PMT ports.
 - Leak test.
- Re-install in HMS. Gently.
- Be ready for beam in August.