

RHIC p-Carbon polarimeters: Run15

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for the polarimetry group

Time Meeting
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Previous run(s) problems → fixes

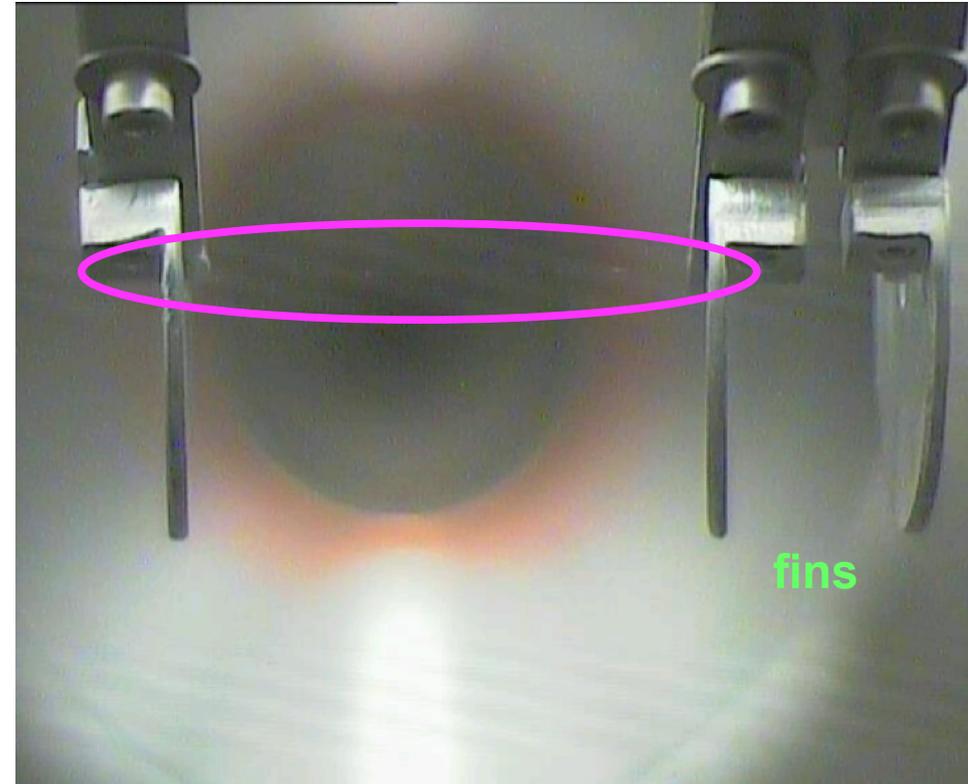
- Limited carbon target lifetime:
modified target holder, reduce EM fields
- Fine pitch Si detector gain instabilities:
mix older (stable) & new (fine pitch) detector designs

Startup & status

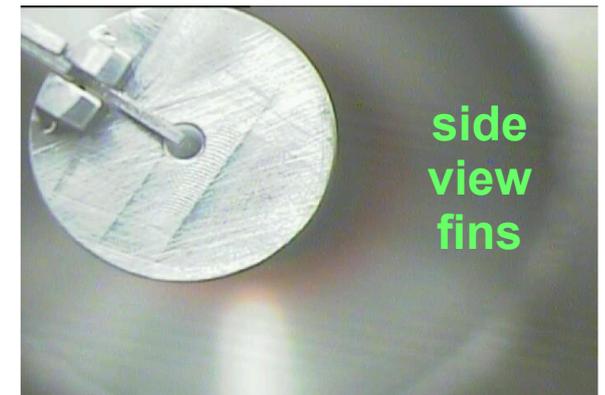
- System was off > 1 ½ years, numerous glitches

Carbon target mortality

- Over years increasing $I_{\text{beam}} \Rightarrow$ reduced target lifetime
last two pp runs required two replacements all targets, big disruption

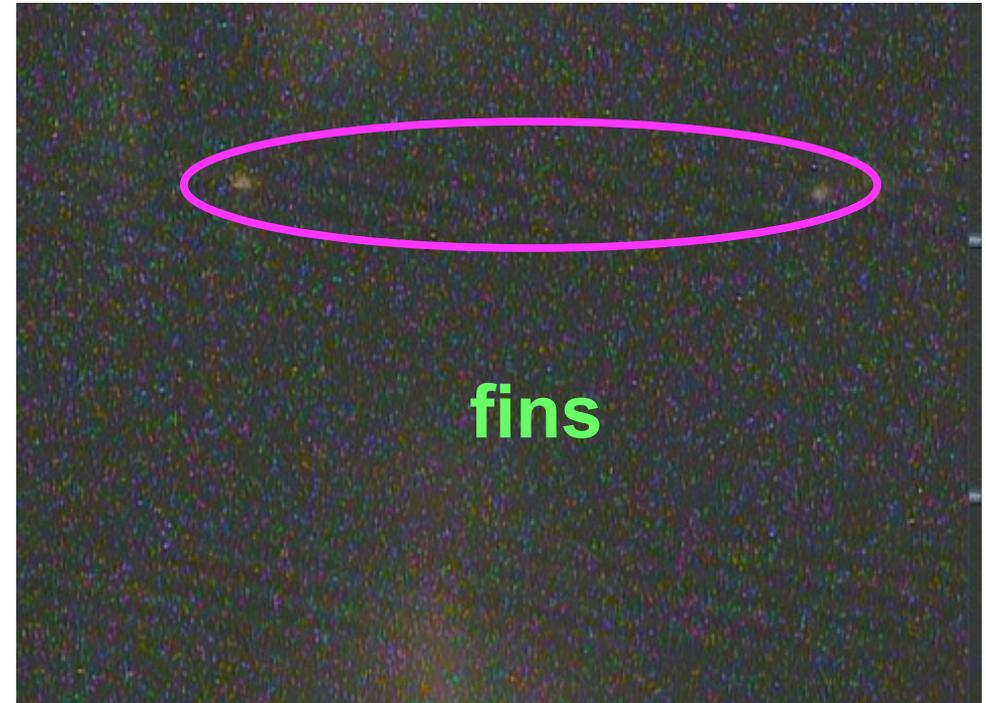


- EM simulation (J. Kewisch) showed beam charge induced high EM fields at target \rightarrow frame attachment (lightning rod)
- high fields \Rightarrow high current in target \Rightarrow heating
- Fix: install 'fins' (flat disks) at attachment point spread field lines, reduce fields



Carbon target mortality

- Spring 2014: tested, move target *near* (not in) Au beam:



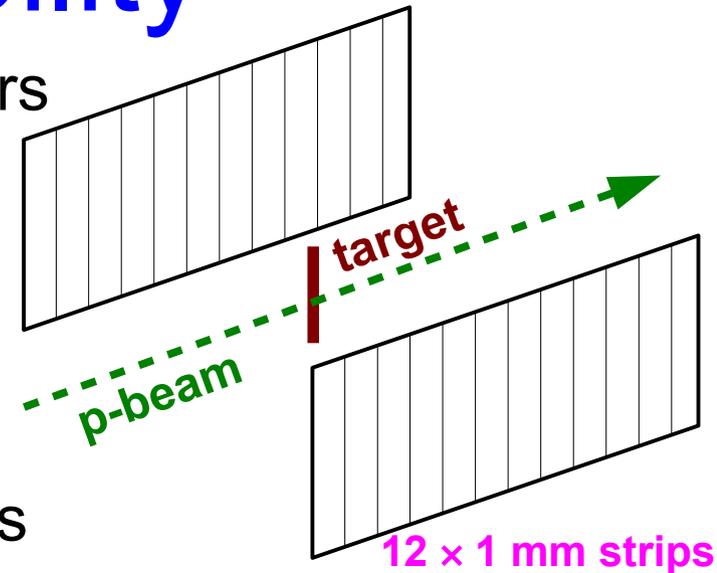
- Clear reduction in glowing (ohmic heating) at attachment point
- Also tested *in* He beam, also reduced glowing at ends

Run15:

- Such fins installed for 32 of 48 targets in 4 pC polarimeters
(no room for fins other targets, hit chamber wall)

Si detector stability

- Run13 used newer fine pitch (1 mm) Si detectors
- Each polarim. one pair detectors
longitudinally segmented:
- Useful info on target looseness,
material along target → detector path (E loss)
- But: 1 mm detectors showed large
gain instabilities, correlated w/ beam operations
- Were able to correct: $\text{gain} \leftrightarrow I_{\text{bias}}$ correlation,
frequent α gain calibrations (end of fills)
- But this is not nice, extra uncertainties introduced



Run15:

- Keep less stable pair 1 mm detectors, longitudinally segmented
- Use older 2 mm pitch detectors for other 4 detectors each polarim.
 - pitch too coarse for target looseness etc. measurement
 - but over years experience 2 mm detectors have stable gains

Startup & status

- System was off & cold > 1 ½ years, predictably some electronic & mechanical decay:
 - several preamps, other electronics modules replaced
 - 3 leaking flanges (feedthroughs) replaced
- Before/during holiday break:
 - all targets installed, most verified visually survived
 - detectors installed, tested, 1 replaced, all working
- Final pump down since Jan. 5
- Ongoing:
 - observing few electronic instabilities, debug
 - new online PCs (H-jet also) finalizing setup
 - restarting software analysis chain
 - polarim. results web page
- Should be ready for start Run15...