

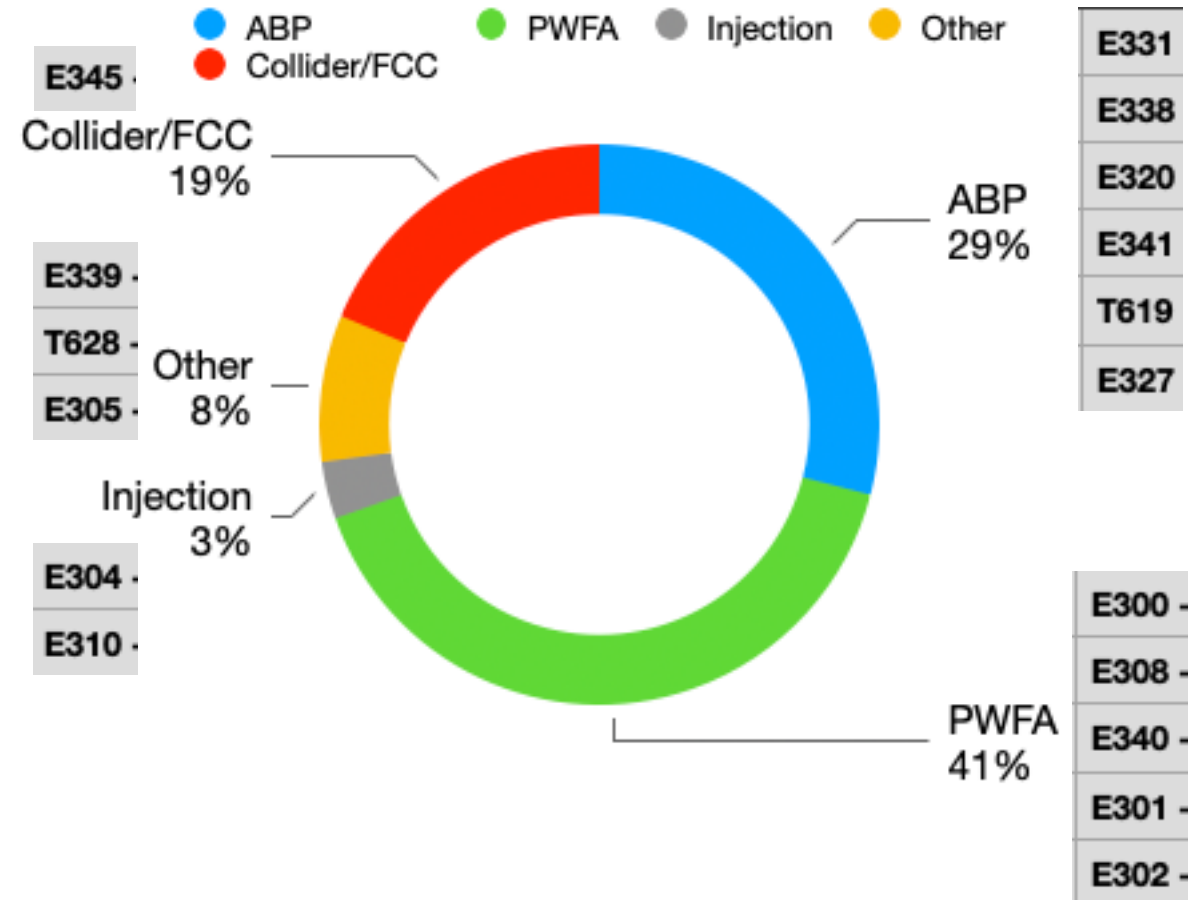
FACET-II Long-term planning

Brendan O'Shea / Division Director / FACET-II

July 10th, 2026

October 2025 - July 2026 in-review

- Where did the time go?
 - 920 hours delivered to experiments
- Biggest users by time
 - E300: 255 hours - hard
 - E345: 170 hours - easy
 - E320: 136 hours - hard
- What does the DOE say
 - PWFA too long-term, AAC roadmap is too old
 - Do science that supports nearer term DOE goals
 - Brendan hears:
 - Collider (EIC and FCCee)
 - BES Applications
 - AI/ML



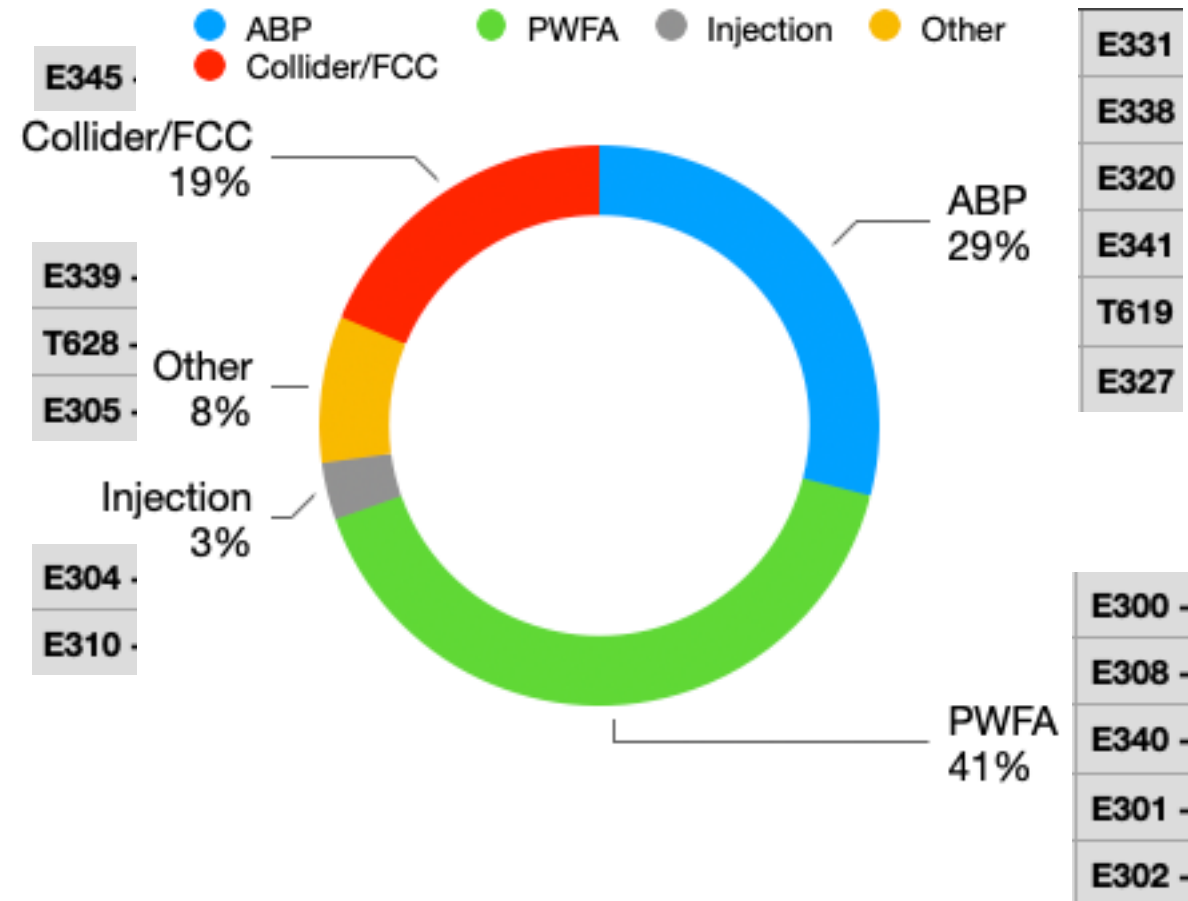
4 Weeks in Oct 2025 and 4 weeks in January 2026 on The Beam

We needed new tools to make measurements easier to use and maintain and more reliable

- Upgraded Optics GUI to python
- MDL FF updates and changes
- Sextupole centering
- Multiple rounds of beam based alignment
- Multiple rounds of coasting beam
- Implement orbit bump
- Upgraded S10 laser to double heater energy
- A lot of time on understanding: dispersion, linac to Wand W -> FF beam parameters
- TCAV GUI upgrade
- Pencil beam tuning
 - Orbit response GUI
 - Final focus alignment
 - Sextupole alignment, strength and positioned repeatability
 - Measuring twiss parameters on IPOTR1
 - Quad scans in the linac
- Fixed collimator to enable full beam slicing
 - Slice twiss measurement GUI
 - BPM jitter measurement + slice measurement
- Probe upgrade to include wavefront sensor and DM
- Modularized experimental setups
- Upgrade to EOS
- So much more...

In response to the DOE's request

- HENP has made it very clear that we need to perform research outside PWFA for colliders
- This means: Injection experiments (BES), high-current beams (BES), AI/ML (Genesis), Colliders (HENP)
- To better perform these experiments there are a number of upgrades in the works:
 - Kraken return to the IP
 - Trojan Horse
 - Double the gas jets for injection
 - Photon acceleration
 - Gamma Detection Chamber (emittance in injection)
 - THz chamber - increase scientific capacity
 - Kelly chamber



How will 2027 play out?

- We are sufficiently funded to run our standard times: Oct/Nov 2026 and Jan-July 2027
- The goal is work with the beam while we have the beam
- I guess the number of user hours will not go down :(

This meeting:

- Tell us what you need to do (it)
- Send in shift requests early
- What are the high-level scientific goals?
- What are your target (high-impact) publications and time frame?
- What data do you have and what analysis has been done?
- What data and analysis is missing to reach that high-impact publication?
- What went well? What could go better? How does this run compare to the last run (Oct 2025 - July 2026)?

The DOE says we are very scientifically productive and impactful

- Publications in the works that I know about
 - Radiation-based beam focusing (Nature Physics - ofv)
 - Multi-GeV Electron Combs (Nature Physics - ofv)
 - SFQED (Nature)
 - Positron Production (Nature)
 - High-efficiency two-bunch PWFA (?)
 - FCCee Jitter Studies (PRAB)
- Hopefully more by the end