

Status

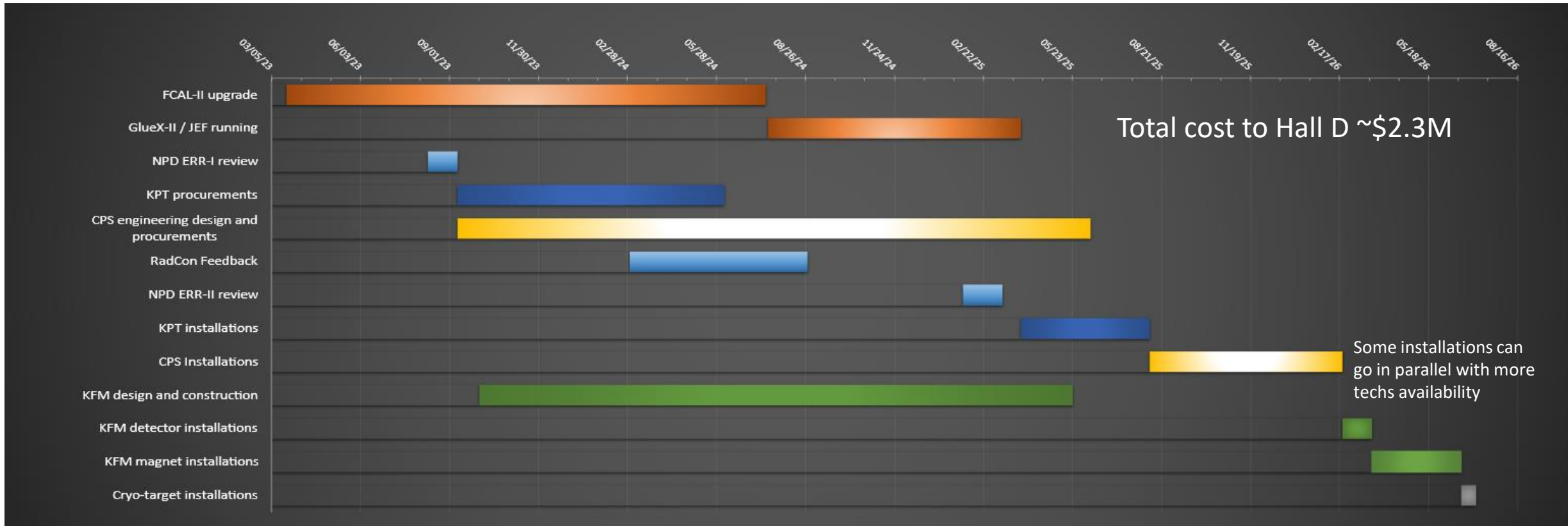
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Where are we now?

- CPS is the main new component for the KLF experiment.
- We have been meeting for about one year to design Hall D version of CPS.
- We started with considering Hall C design.
- Vitaly proposed a new larger design to avoid overheating of the copper core of CPS and significantly reduce the cost.
 - Temperature and radiation condition in and around CPS have been evaluated.
 - Temperatures have been estimated with ANSYS with fine and coarse mesh.
 - Conditions outside of the halls are estimated as well. No problems seen there.
 - The design is already in an advanced stage.
 - Tim has magnet conceptual design for the “reference design”.
 - Vitaly is working on optimizing the design for the cost and radiation environment.
- Pavel suggested another design in December of 2022.
 - Based on the original ideas for KLF CPS from many years ago
 - This seems to be a promising option as well.
 - Pavel plans to work on his design during next few weeks.
- In addition to being the Hall D contact, I will also be managing the projects parts that are funded from Hall D budget.
 - Includes CPS, KPT, electron and photon beamlines.
 - Decided on KLF meeting on April 4th.

- Compact Photon Source (CPS) status
 - Conceptual design is still in progress.
 - Material and fabrication cost estimate: **\$1.5M** with a large uncertainty.
 - Engineering design and procurement: 21 months after ERR-1 approval
 - Requires 1 designer and 0.5 engineers for the duration
 - Installation : 6.5 months
 - Requires 3.5 technicians and 0.2 engineers for the durations
- Accelerator / Beamline instrumentation
 - Beam bunching of 64ns and 128ns are being studied.
 - Compatibility with MOLLER is under investigation.
 - Exact electron beam steering and focusing requirements dependent of CPS design
 - Preliminarily the beam size and rastering requirements are not very different from GlueX.
 - They were presented to Edith Nissen. No major obstacles is seen.
 - Exact beam-related costs to Hall D are not known, assumed **\$0.2M**.

- Collimator cave status
 - Conceptual and engineering designs are complete
 - Material and fabrication cost estimate: **\$0.3M**
 - Procurement: 9 months after ERR-1 approval
 - Installation 4.3 months
 - Requires 3.5 techs and 0.1 engineers for the durations.
- Kaon Flux Monitor (KLF)
 - No conceptual design yet
 - Multiple scenarios are being considered based on the funding approval .
 - Original estimate of \$0.7M should be covered by University of York.
 - Cost to Hall D is not known yet
 - Strongly depends on the conceptual design, assumed **\$0.3M**
- Cryo-target
 - Requires change of the target cell size.
 - Will be fully covered by the Target Group.



Plans for the Next Few Months

- We need to finalize Vitaly's design.
 - Finish the optimizations and studies.
 - Write a nice document for the reviewers.
- Pavel will work on further developing his design.
 - Need approval of RadCon group management.
 - Develop the final design, including the magnet.
 - Write a document for the review.
- For both models we also need to check the stability of the core temperature of CPS design with respect to:
 - 1) Electron beam width variations (make beam narrower and wider)
 - 2) Electron beam position variations
 - 3) Electron beam direction variations
 - 4) Magnetic field variations on order of a $\sim 1\%$
 - 5) Change of the thickness of the radiator
- Define the electron beam requirements (steering, focusing, stability) for both CPS models.
- Check the temperature of the radiator at 10% R.L.
 - Assume some kind of water cooling
- Pick the design for the review and pass the review
 - We need to get as few comments and suggestions as possible to make the schedule of July 2026 running.