

Questions to answer (or at least raise and discuss) in the Photocathode Godparent Review

Organization

1. Who are the members of the Photocathode group?
2. What are the goals of the Photocathode group?
3. What is the organization of the Photocathode group?
4. What are the official milestones?
5. What are the internal milestones?
6. What are the related efforts and resources that are being accessed?
7. Are there actions that can be taken to enhance the synergies ¹.

Multi-Alkali Basics (Pillar 2)

1. What role will the Burle equipment play?
2. What role will the Growth and Characterization Facility play?
3. Which recipes will be tried in a 4" PC?
4. What will be the basis of our baseline recipe?
5. What is the methodology for learning from trying different recipes?
6. What (physics, techniques) does one learn from trying different recipes?
7. Could there be measurements and physical understandings that will be publishable in physics journals? Examples?
8. What new methods/techniques go into the commercial very high QE recipes?
9. Do we have the tools to experiment with these?
10. What is the role of substrates in the QE?
11. What is the role of front-surface anti-reflection coatings in the QE?

Multi-alkali Tile Photocathodes (Pillar 3)

1. What are the specs for the 1st-gen SSL PC? (QE, uniformity, life, noise, ...)?
2. What is the status of the SSL effort (facilities and results)?
3. When does the SSL group expect to have made an 8" PC?
4. When does the SSL group expect to have transferred and sealed an 8" PC?
5. What are the specs for the 1st-gen ANL PC? (QE, uniformity, life, noise, ...)?
6. What is the status of the ANL effort (facilities and results)?
7. When does the ANL group expect to have made a 4" PC?
8. When does the ANL group expect to have made an 8" PC?

¹great phrase- all synergies should be enhanced.

9. When does the ANL group expect to have transferred and sealed an 8" PC?

GaN, InGaN, GaAs, CsTe, and others

1. Do we believe we can make a III-V PC with low-enough noise and adequate QE at 350-450 nm for HEP neutrino or collider applications?
2. Is ALD a good candidate for making a functioning PC?
3. What QE can be achieved at 400 nm in a III-V that can be made with ALD and pure-gas transferred for sealing with no additional processing?
4. What applications would benefit from III-V over multi-alkali, and why?
5. Are there other reasons to pursue III-V (e.g. low emittance, theoretical modeling comparisons, ultra-high QE, ...)?
6. When might one make the first PC that could be used in the APS laser test setup?
7. When might one make the first 33mm PC?
8. When might one make the first 8" PC?

The Photo-cathode Growth and Characterization Facility

1. Can the PC-GACF construction be staged?
2. What is the estimated cost and spending rate for constructing the PC-GACF?
3. What are the staffing needs of the PCGCF?
4. What is the maintenance budget of the PCGCF?

The Tile-Factory PC Subsystem

1. What is the cost of materials to make an 8" multi-alkali in quantity?
2. What is the proposed procedure for making and sealing an 8" PC?
3. What is the estimated cost and spending rate for constructing the Tile Factory PCS?
4. What are the staffing needs of the Tile Factory PCS?
5. What is the maintenance budget of the Tile Factory PCS?

Next Steps

1. What are the next steps?