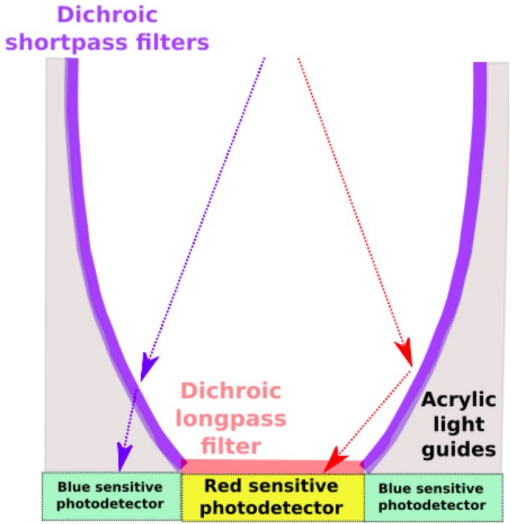
Weirdness in G4 photon production?

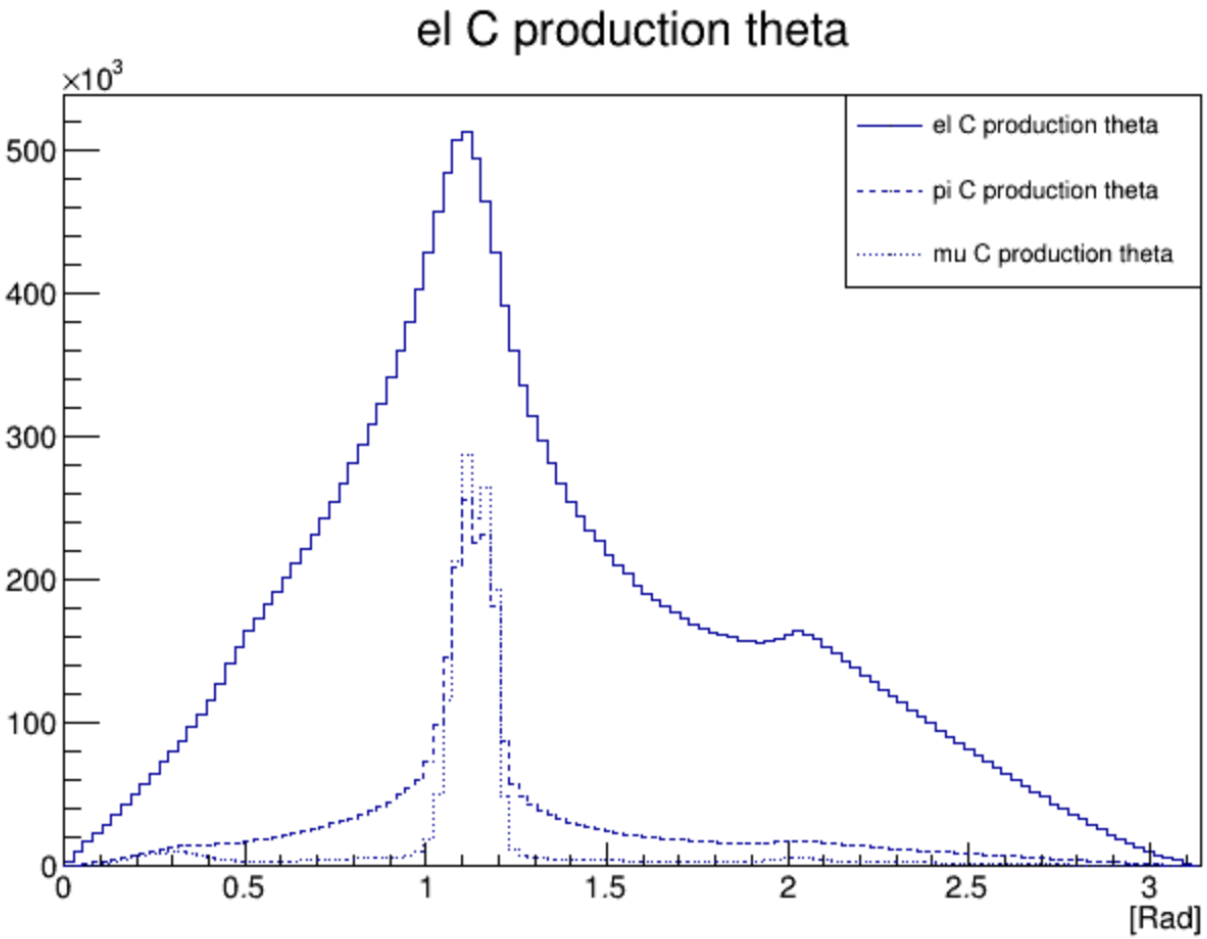


This started with thinking about dichroicons again:

? might it make sense to use a simple 4 sided pyramid wave guide with a dichroic filter at the center for C light, then collect S light from whatever leaks out on the sides

Not implemented yet, but to start I looked at exit, the production angles of the light

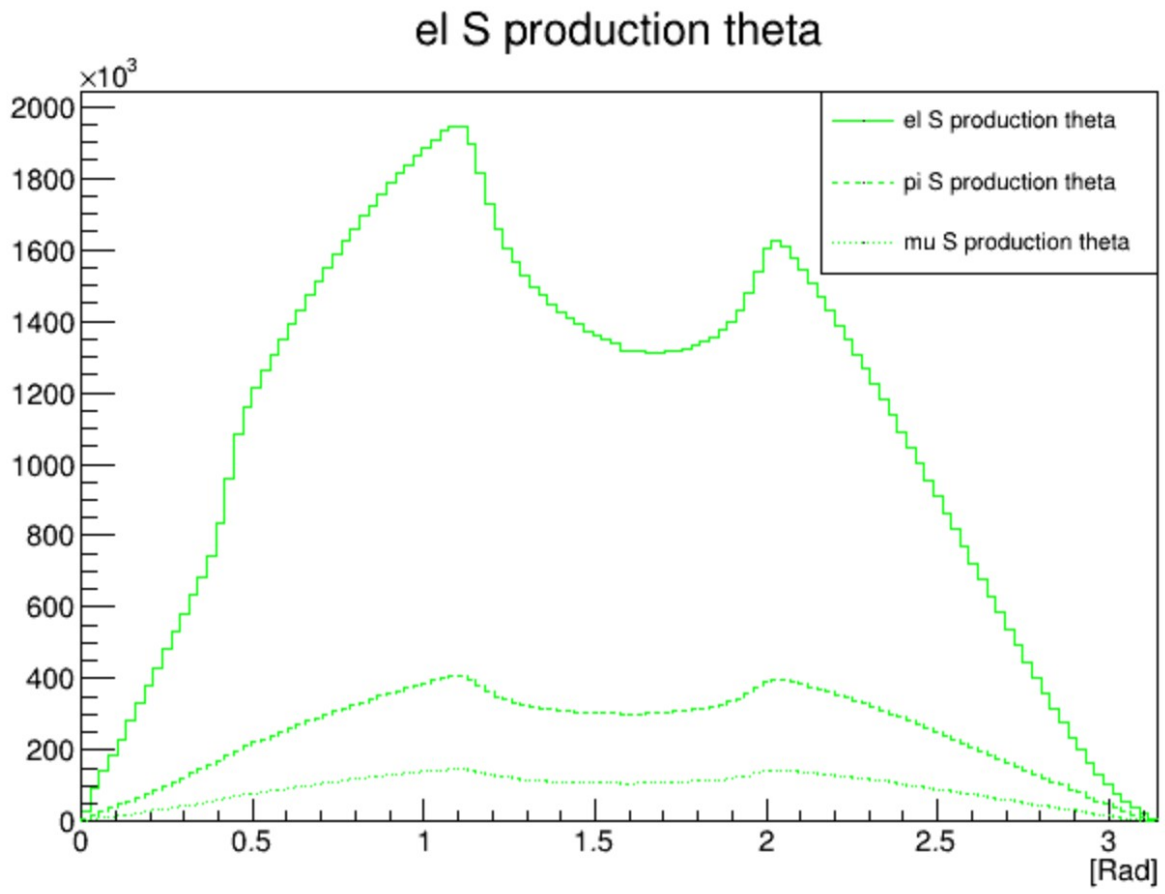
Weirdness in G4 photon production?



Production angle (theta) for C light

For n=2.15, max Cherenkov angle is ~1.08 rads

Weirdness in G4 photon production?



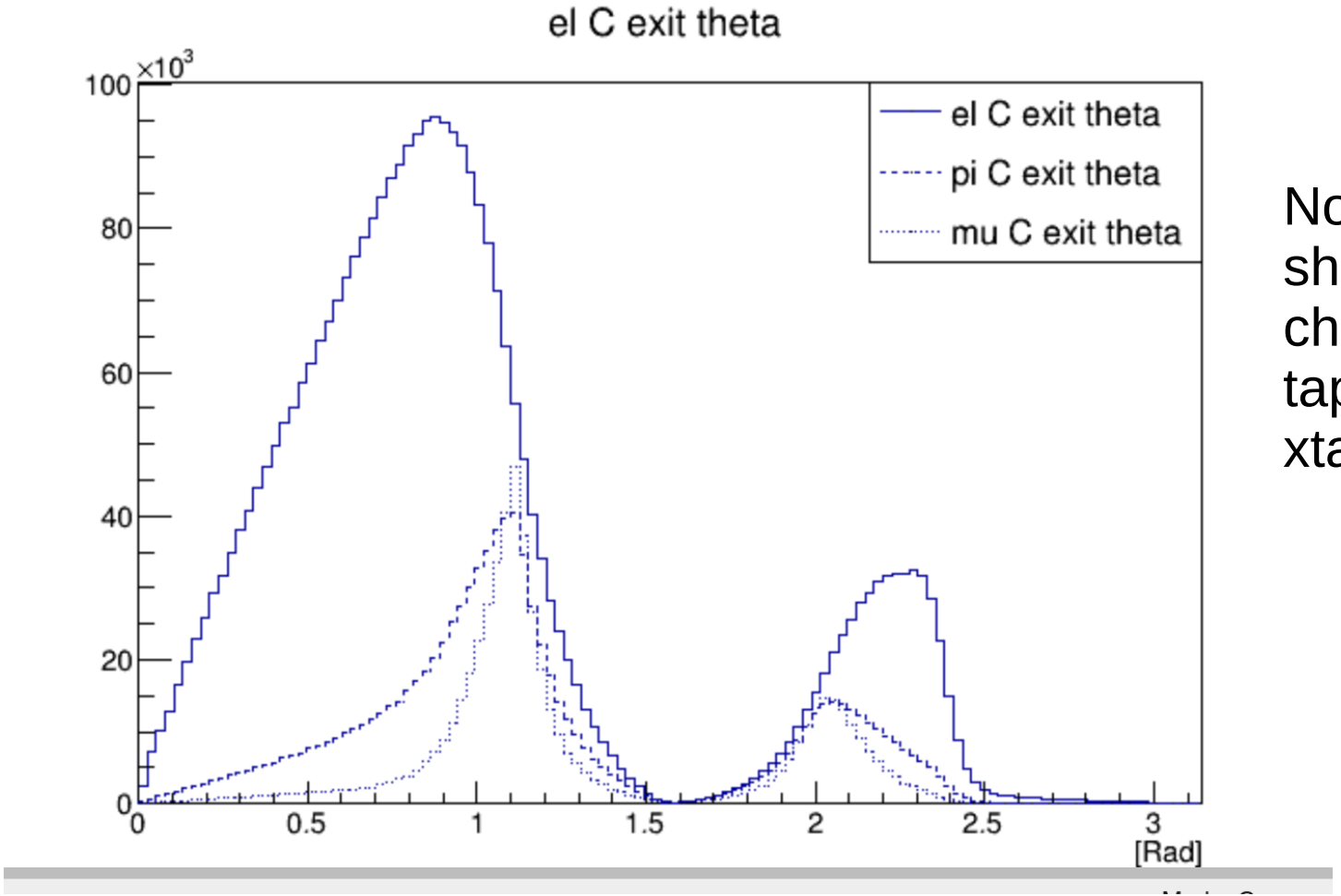
Production angle (theta) for S light

???

Peaks probably correspond to S photons secondary to C production, but why is so little S light produced in the forward/backward direction?

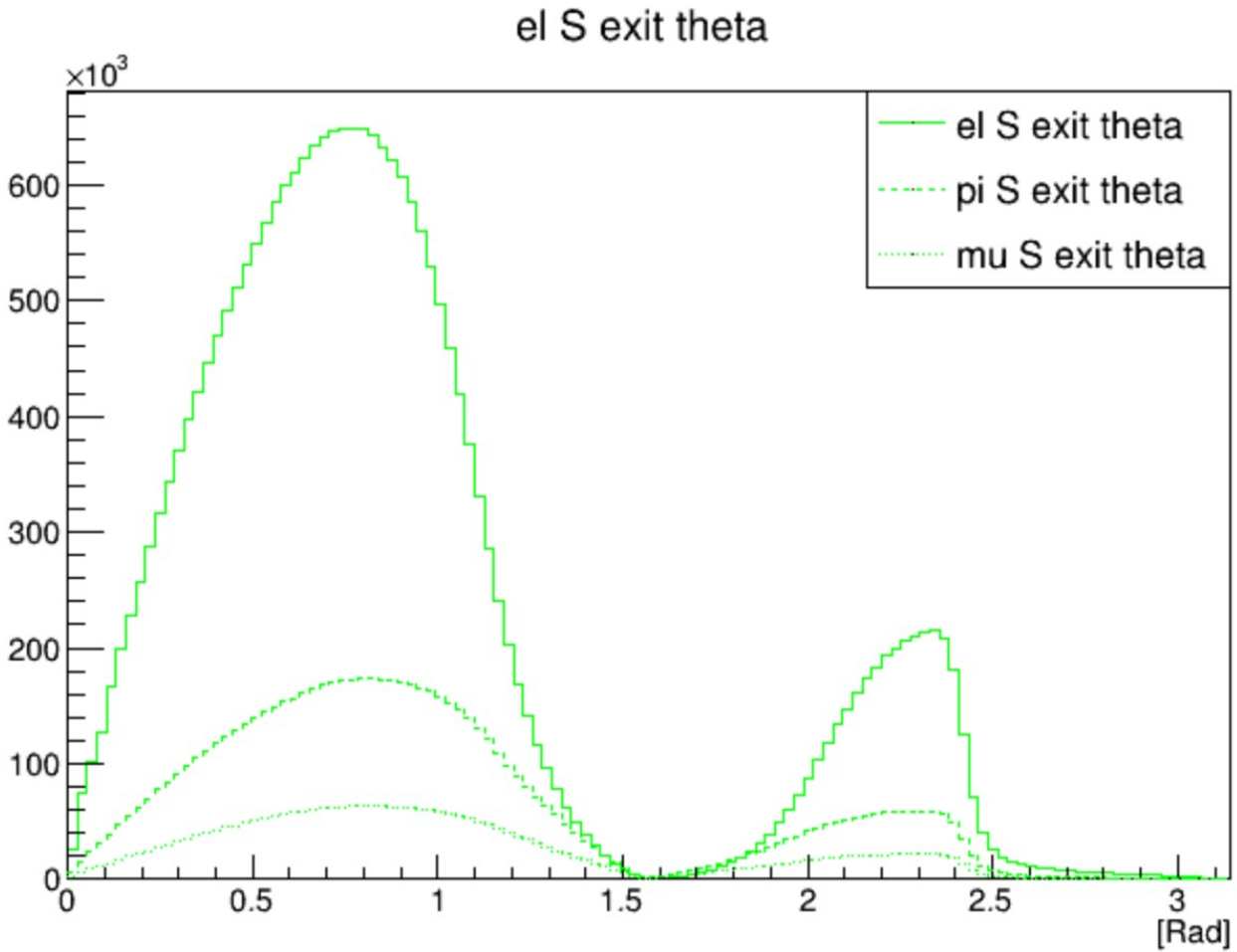
Maybe it’s a bug, but the code is pretty simple.

Corresponding exit angles

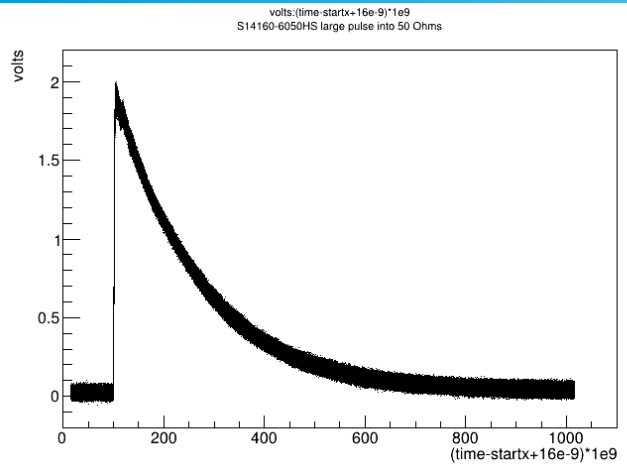


Note: this should change with tapered xtals...

Corresponding exit angles

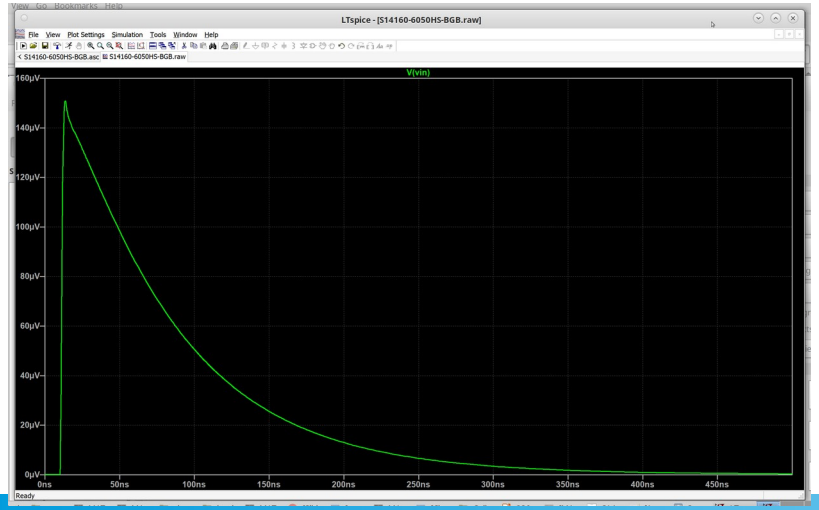


Updating electronics

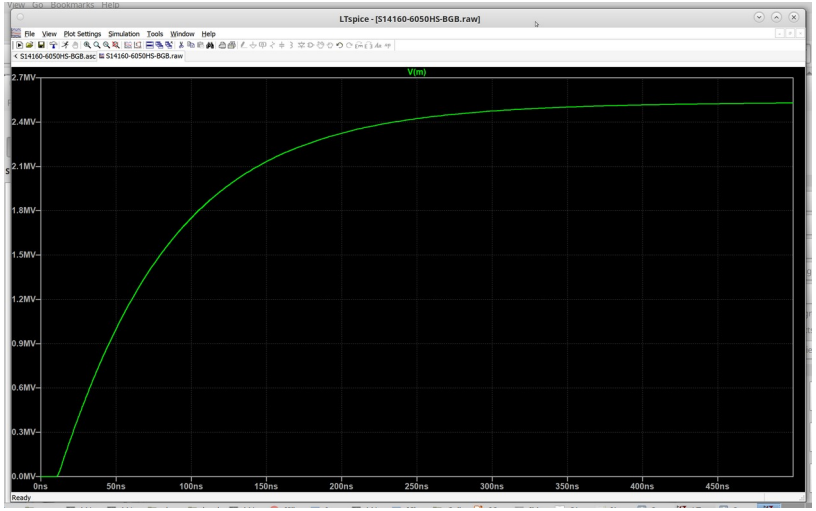


Start w/ measured sipm response, large LASER pulse, no amplifier

Model using ad tune of circuit in https://doi.org/10.1016/j.nima.2018.11.118



Qualitatively similar pulse shape and gain



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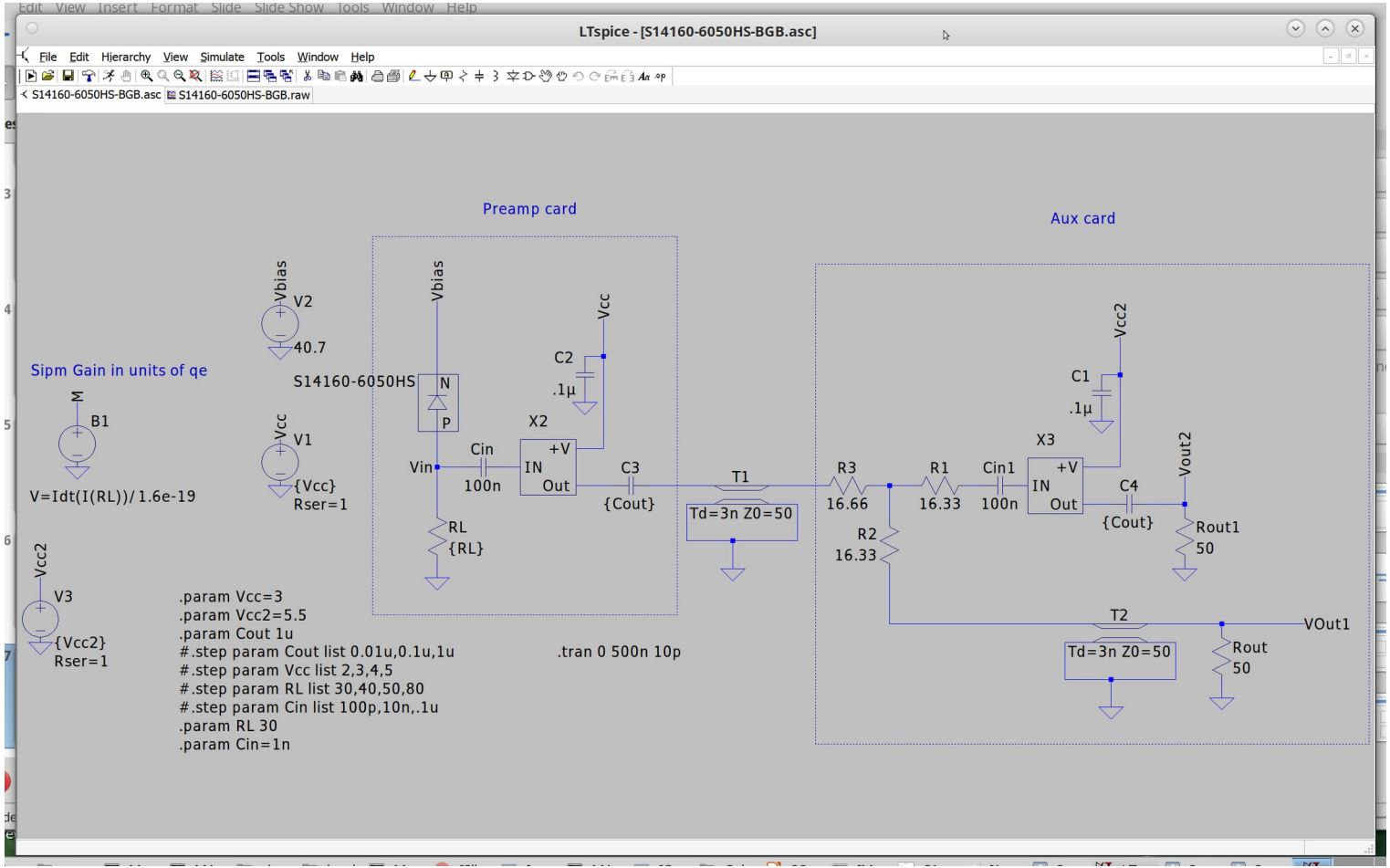
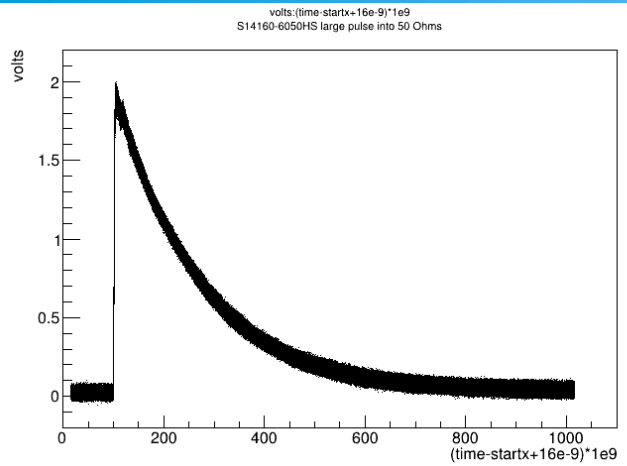


New two stage amp

- Conservative design
- Preamp on SiPM card
- TEC mount
- Secondary card for higher gain output
- Some gain adjust
- Details from Thomas

Updating electronics



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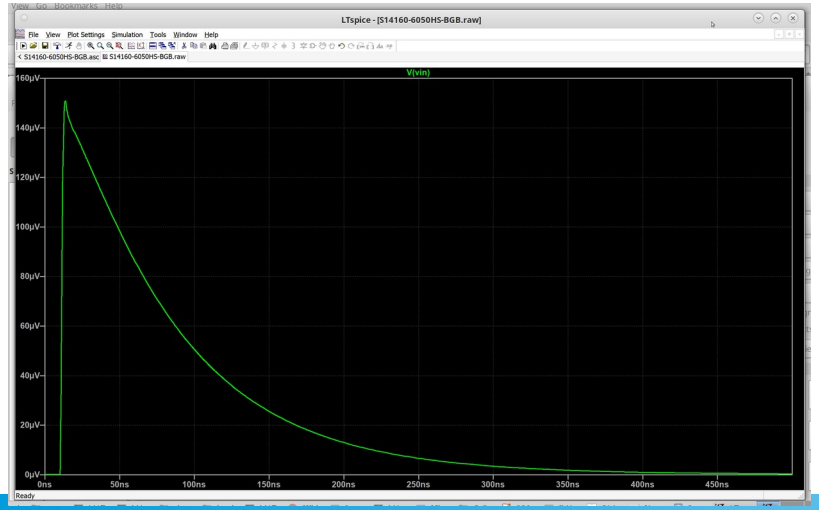

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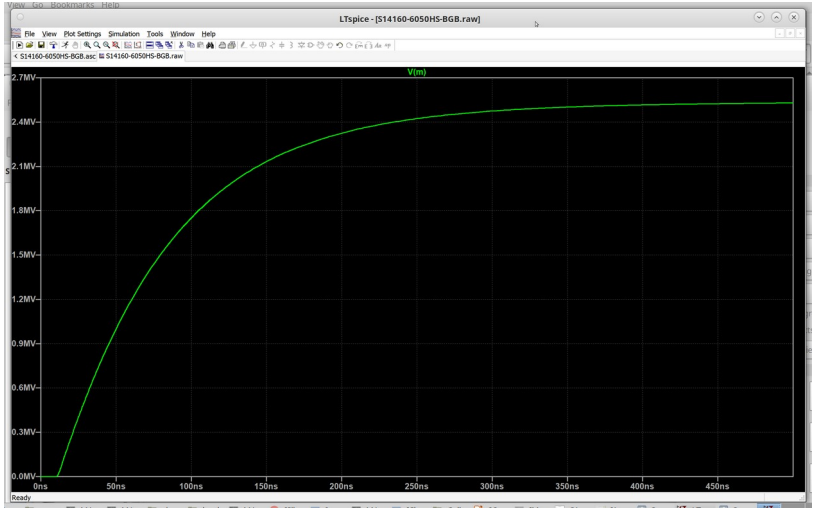

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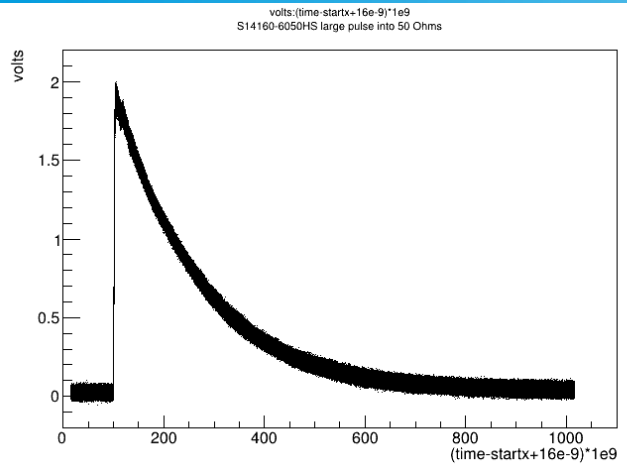

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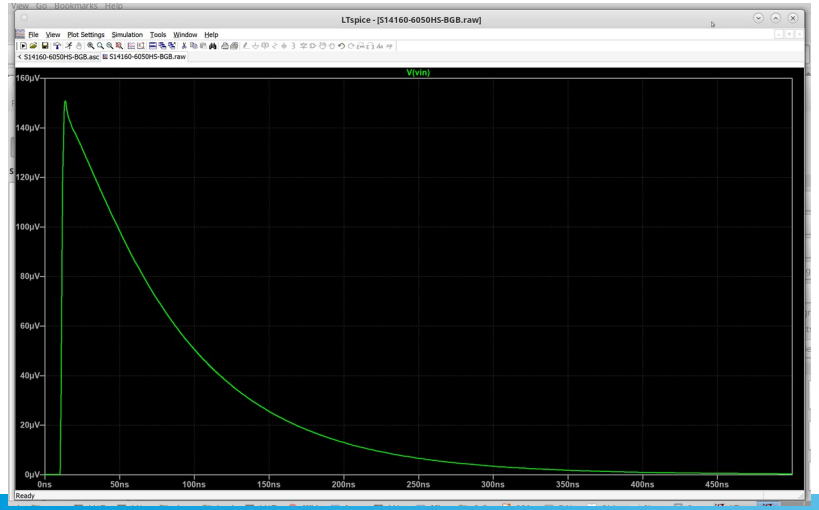

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