OSC Updates

- Bessel function factor valid off-peak
- 1 GeV, K = 7 wiggler radiation

500 MeV Results (Last Week)

	Peak Field (V/m)	Energy Transfer (meV)
SRW – telescope Square lens, 16mm/side	38	93
SRW – lenses as above, Ignore extra bit of undulator	38	81
Lebedev - circular lens, radius 8mm	35	79
Lebedev - circular lens, radius 8 x sqrt(2) mm	41	93
L-W code – square lens, 16mm/side	38	85
L-W code – circular lens, 8mm radius	35	80

1 GeV Results (Planar Undulator)

	Peak Field (V/m)	Energy Transfer (meV)
SRW – telescope Square lens, 16mm/side	38	95
SRW – lenses as above, Ignore extra bit of undulator	38	83
Lebedev - circular lens, radius 8mm	35	81
Lebedev - circular lens, radius 8 x sqrt(2) mm	42	96
L-W code – square lens, 16mm/side	38	

Explanation

- High K throws more energy off-axis (K/gamma) and into higher harmonics

- High gamma collimates radiation more (K/gamma) and has higher intensity overall

Future

- Off-axis focused radiaiton?
- Helical undulator/wiggler

Sloppy Models Updates

- Identifying potential source of tbt oscillations
- Genetic algorithms' ideal population size
- Orbit shift effects

Source of tbt Oscillations

- Assume response at button b, turn t is given by $Y_{bt} = R_b W_t + rand$ (Y_{bt} is measured y position, R_b is button response, W_t is wave amplitude, rand is noise of 10 micron rms)

- For 100 turns, in east half of ring, do simple fit with free parameters R_b and W_t to minimize sum of

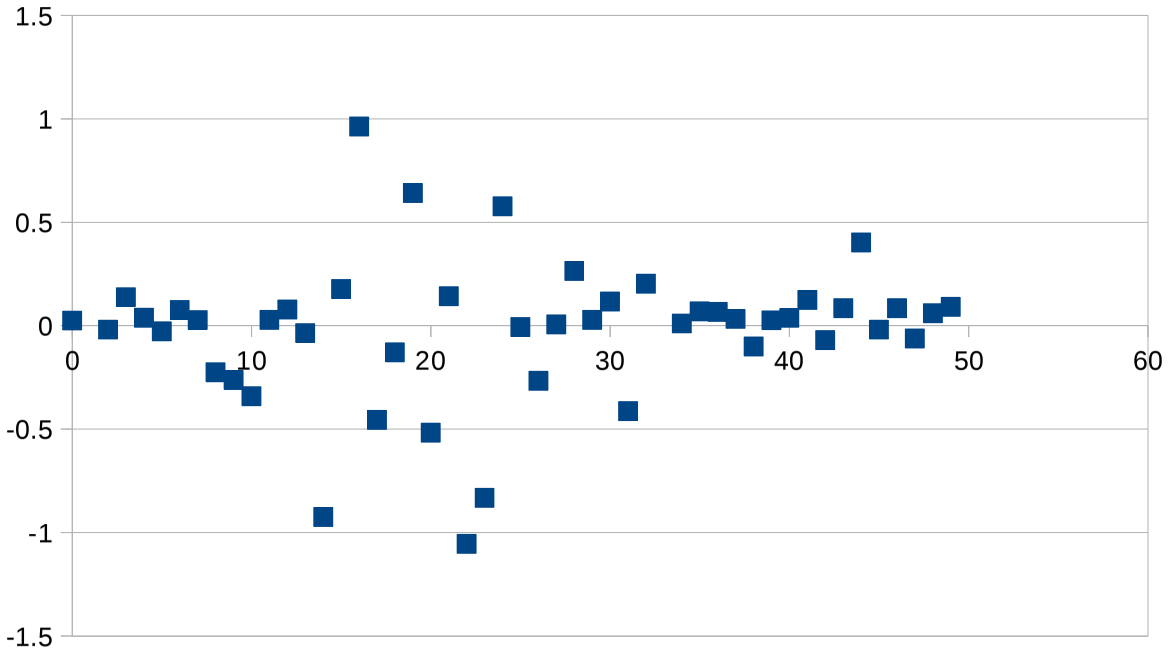
  $(Y_{bt} - R_b W_t)^2$

- Plot the R_b

Data

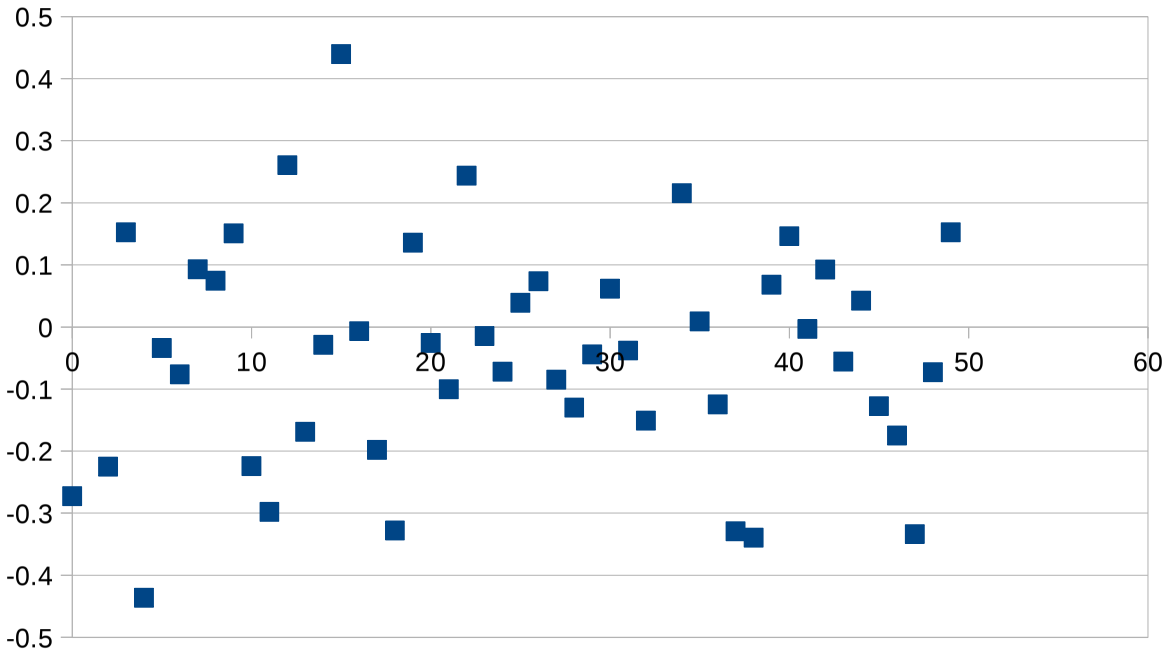
- Speed of light measurements in October
- Made sure to turn off feedback and put in attenuator for good measure

100 Turns, Data

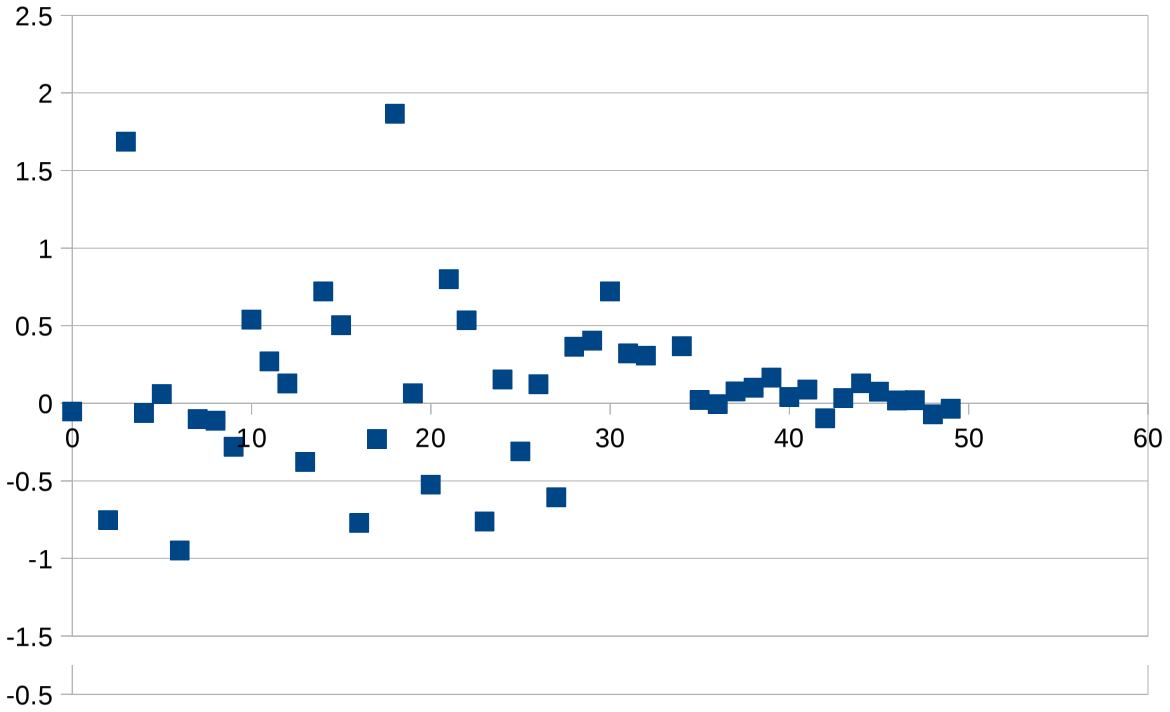


Horizontal axis is BPM number, vertical is response to wave

Simulation of 60 Hz Wave
40 micron Amplitude
Nothing in Last 15 BPMs



Simulation of tbt Wave
6 Micron RMS
Nothing in Last 15 BPMs



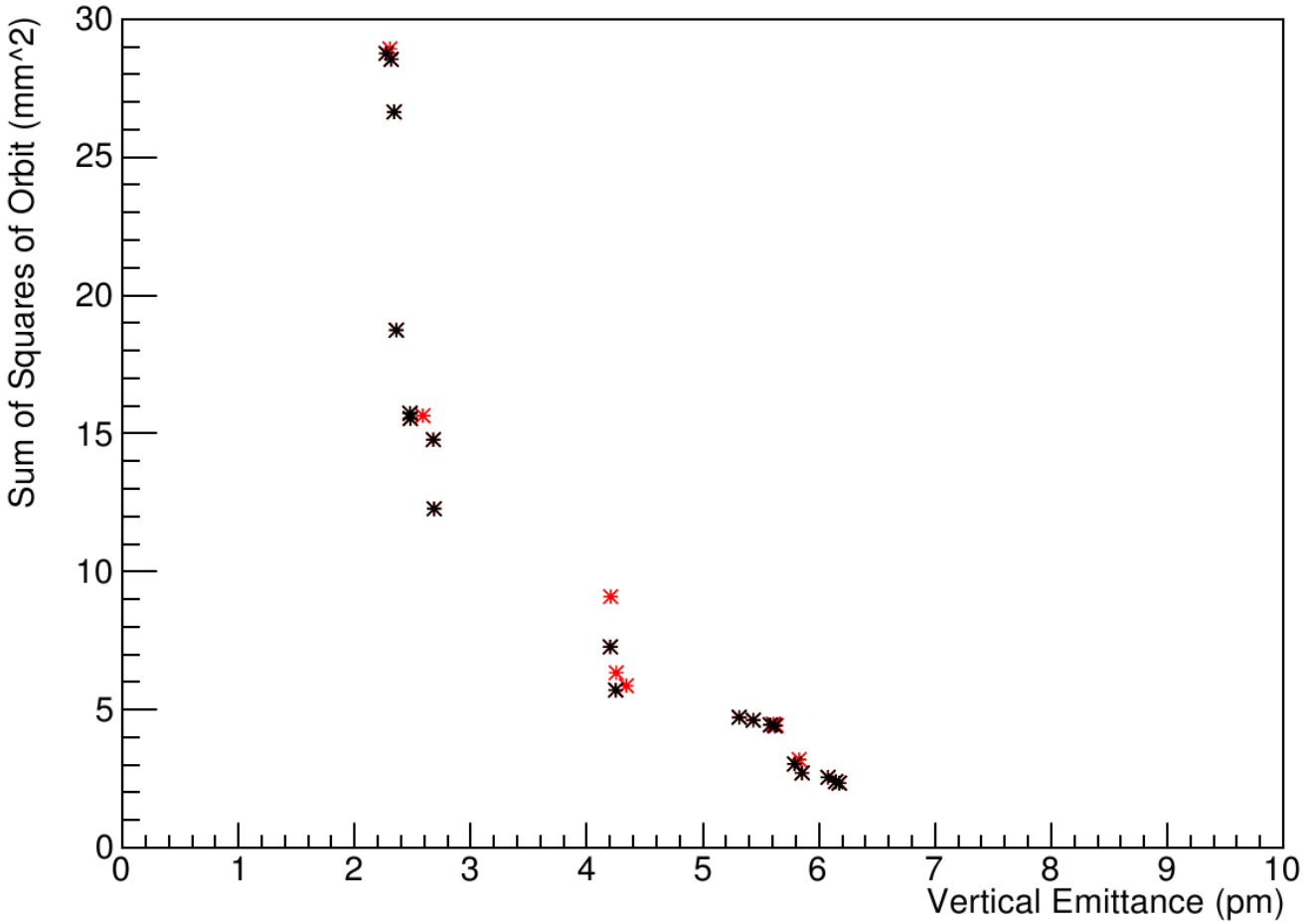
Conclusion

- Something funny happening near 34E
- In this region is INJS34E

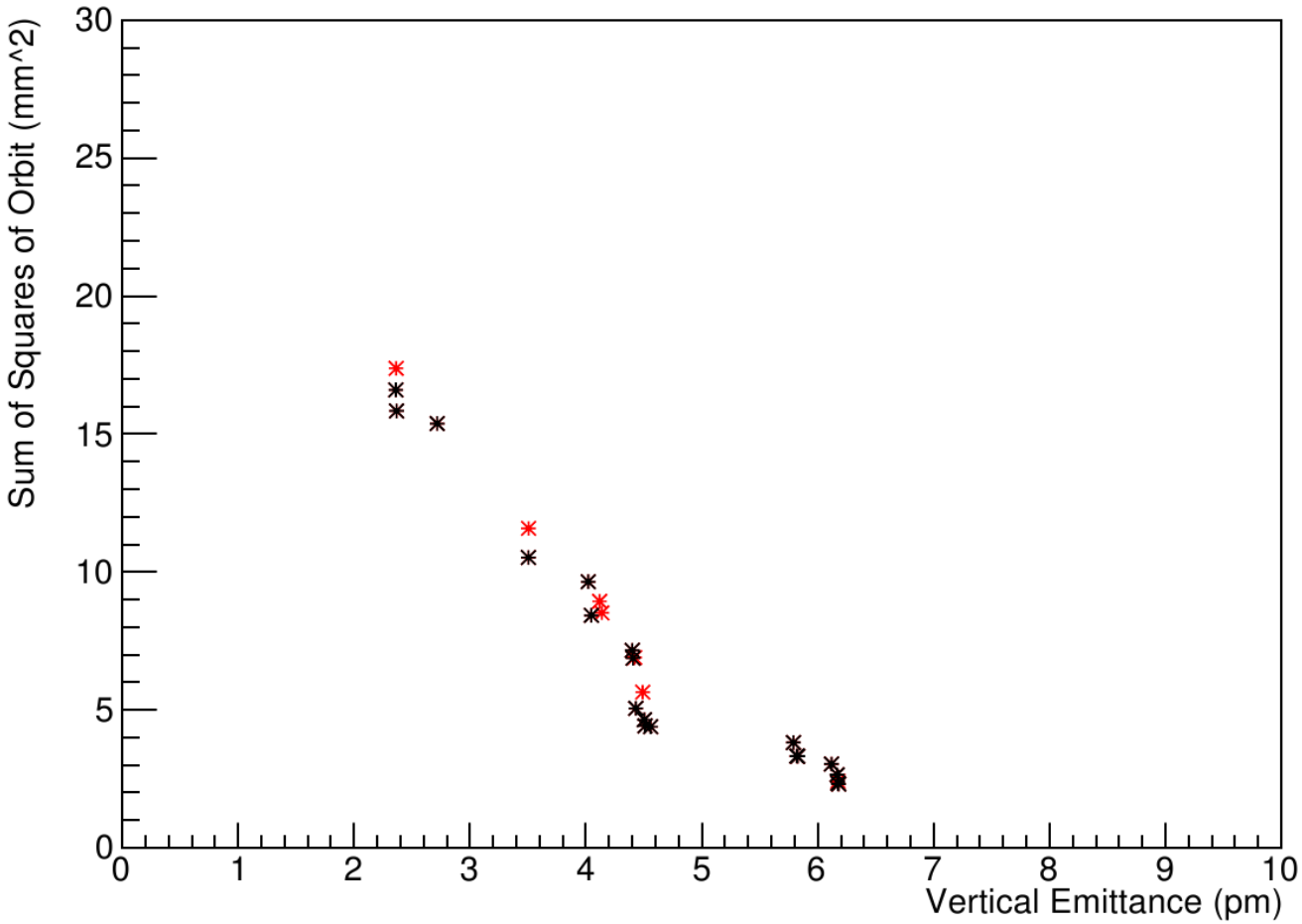
Genetic Algorithm's Ideal Population Size

- Use populations of 20 and 30 individuals (knobs, seeded with Jim and 8-knob solutions)
- Run for equal number of function evaluations
- Redo with new random seeds

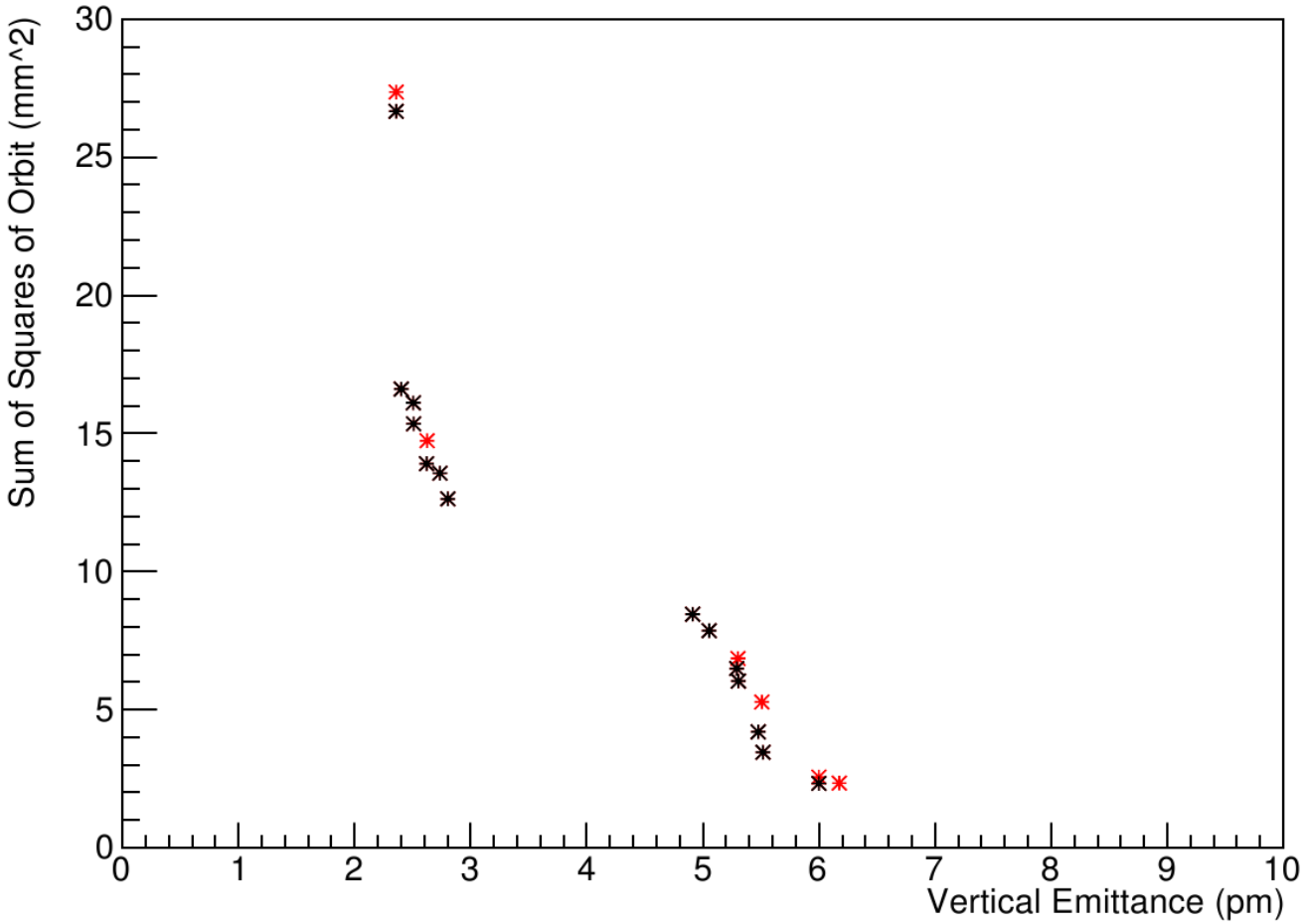
600 Function Evaluations
30 Population



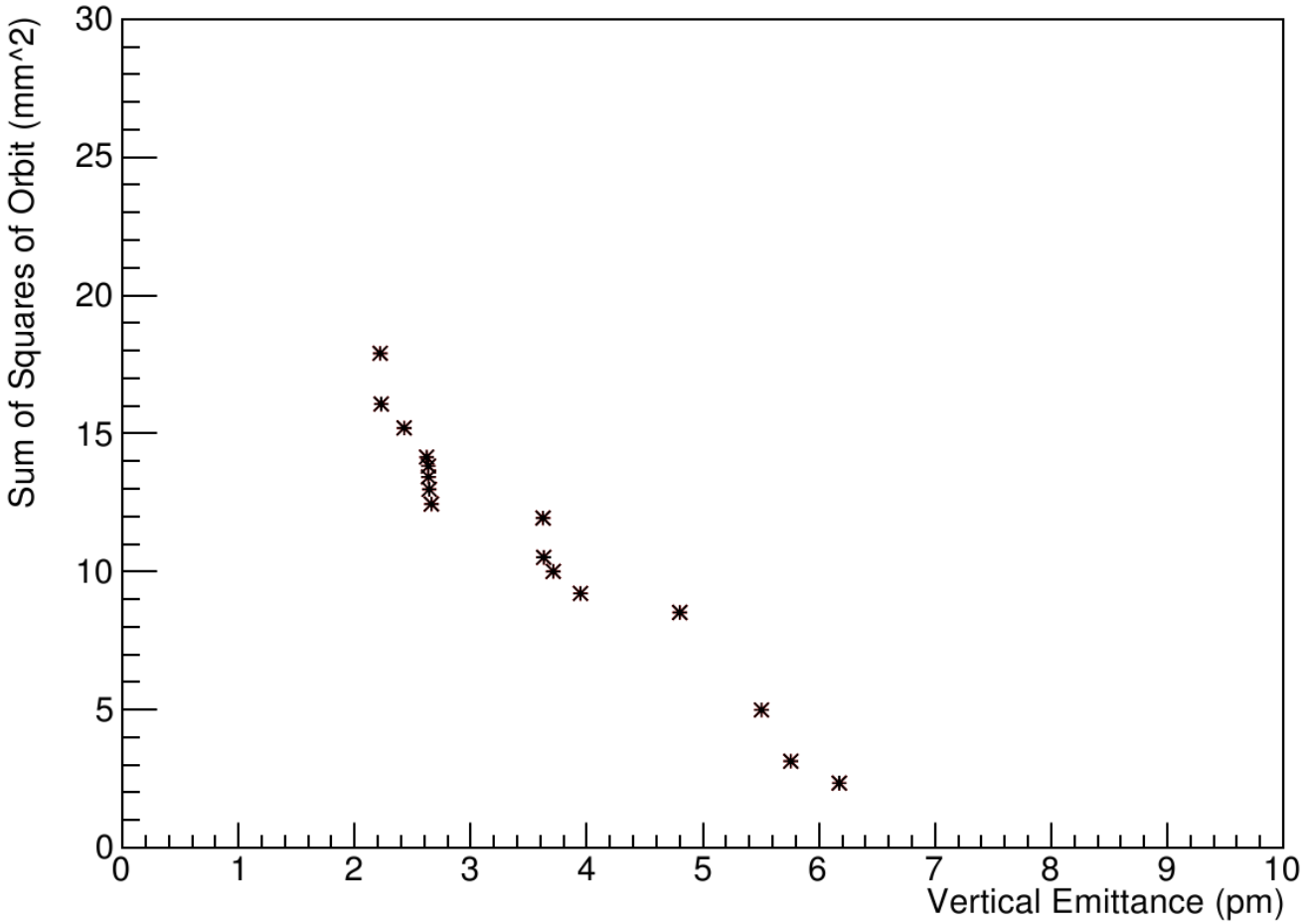
600 Function Evaluations
30 Population (Again)



600 Function Evaluations
20 Population



600 Function Evaluations
20 Population (Again)



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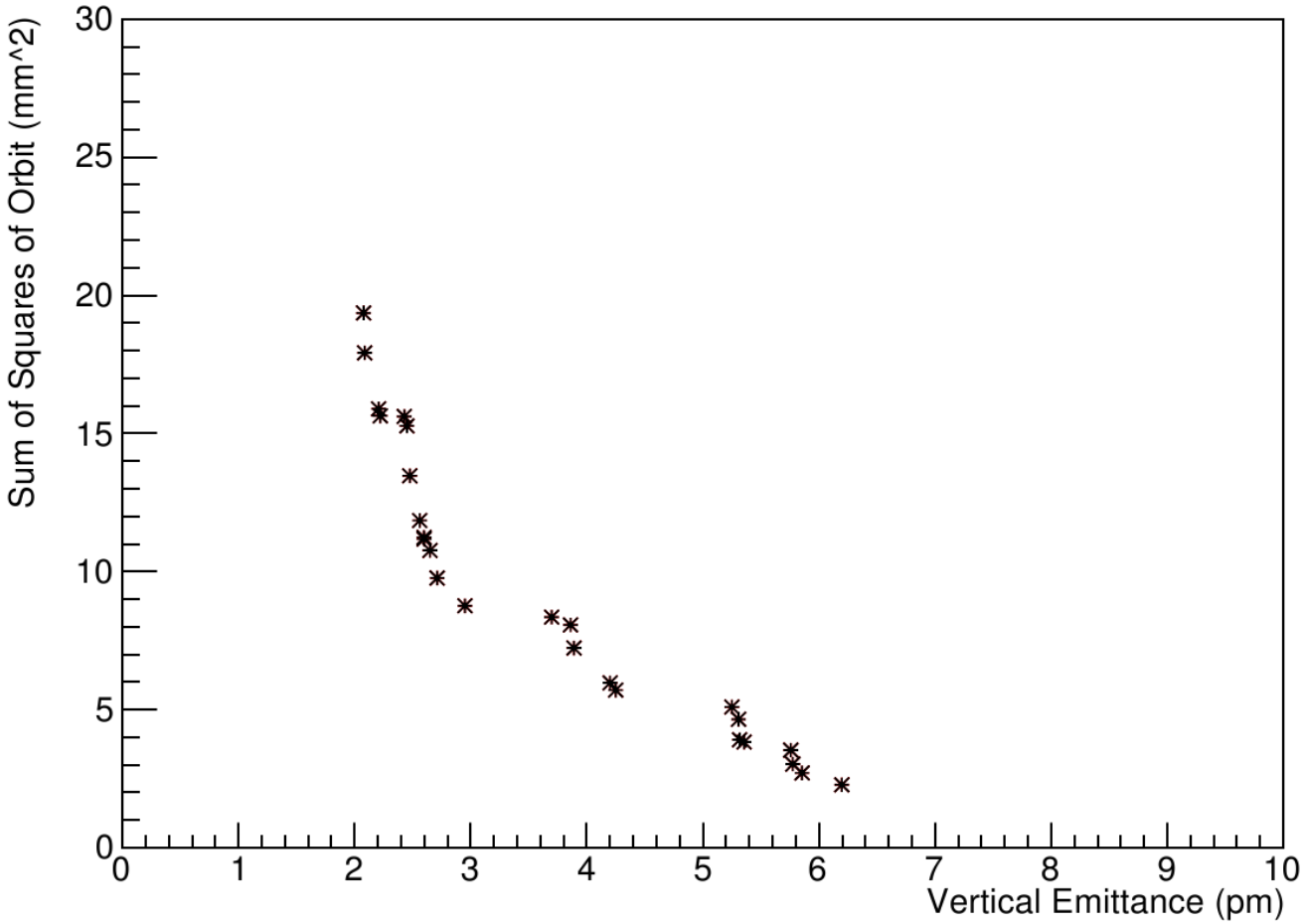
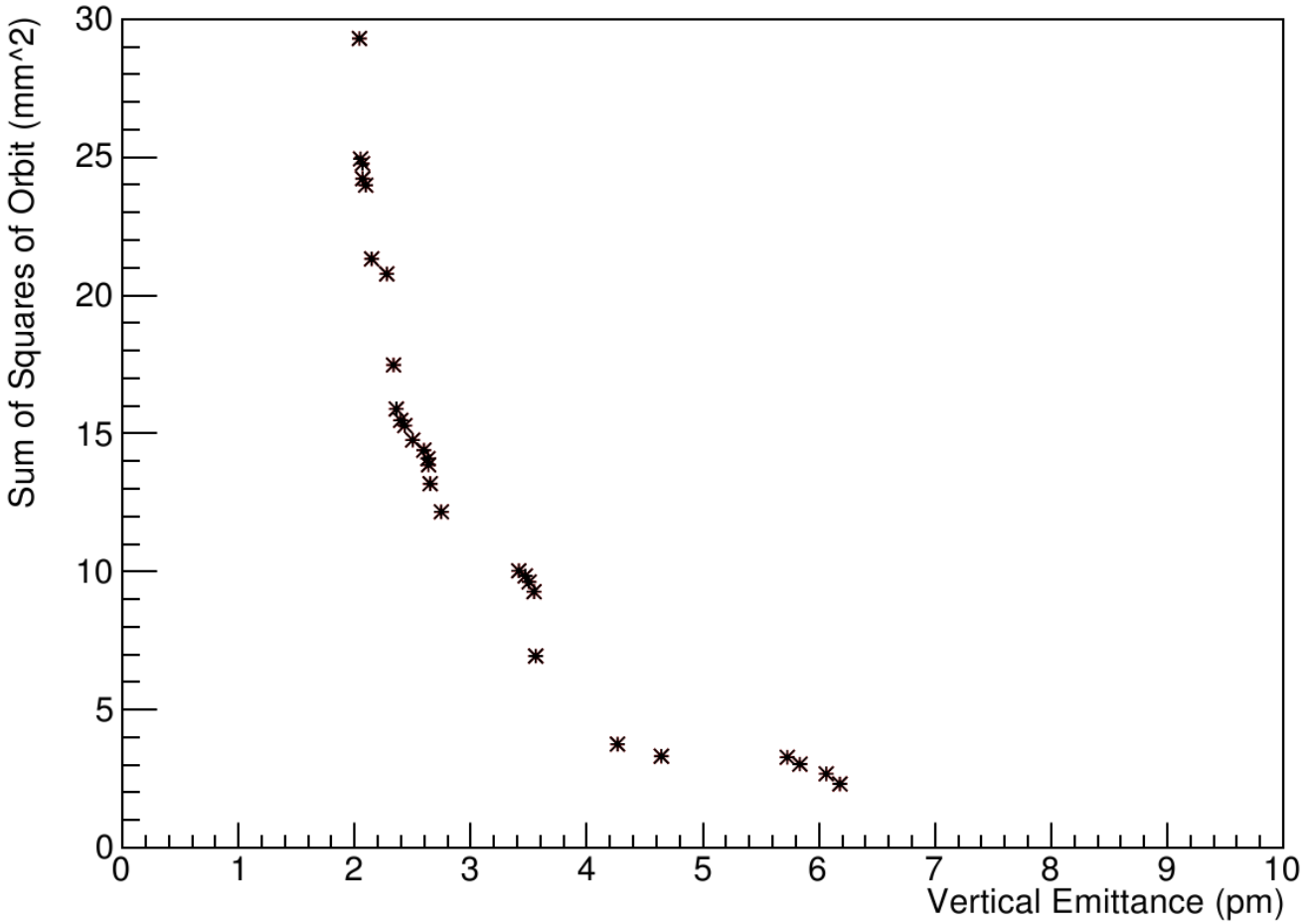
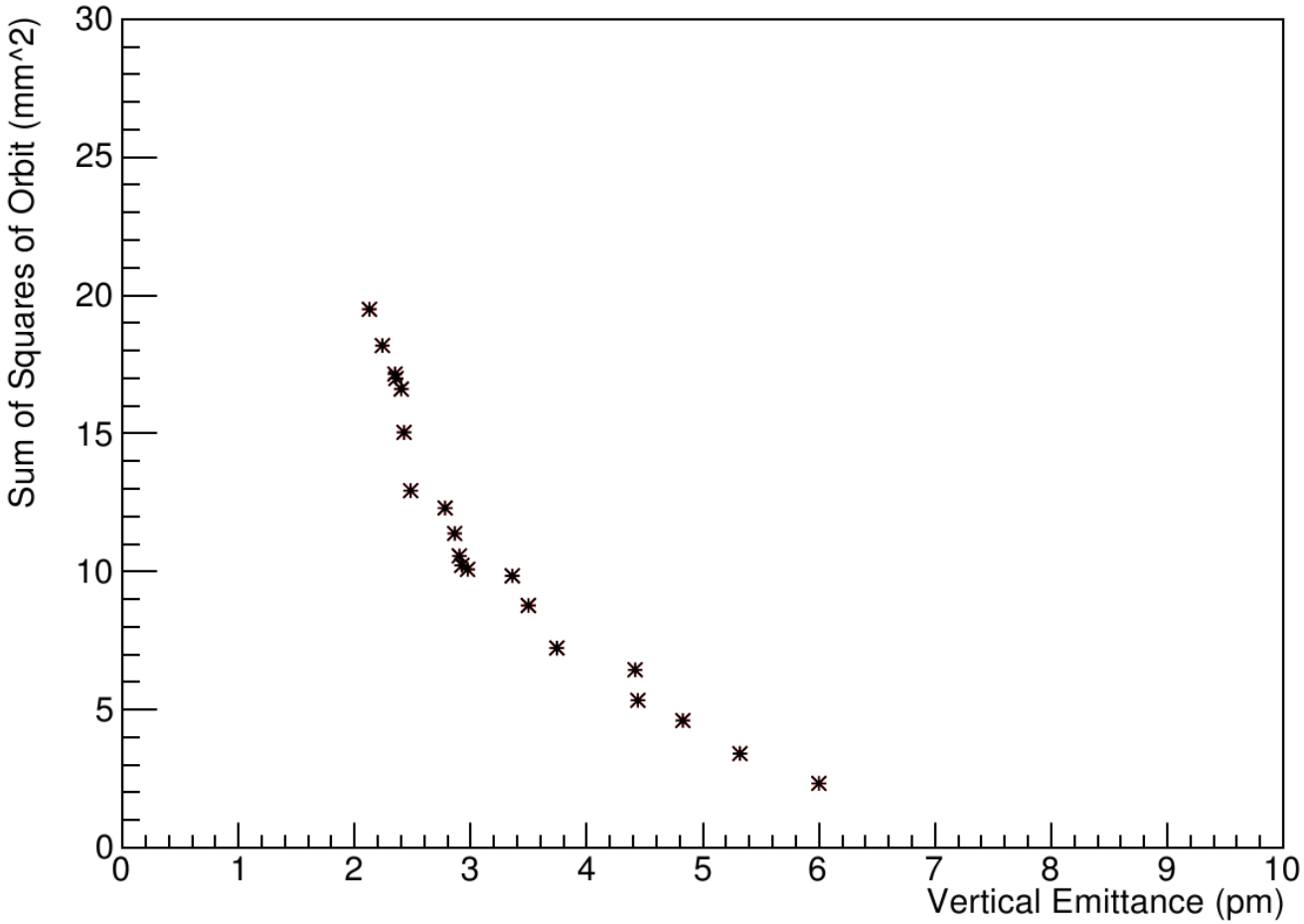
1200 Function Evaluations
30 Population



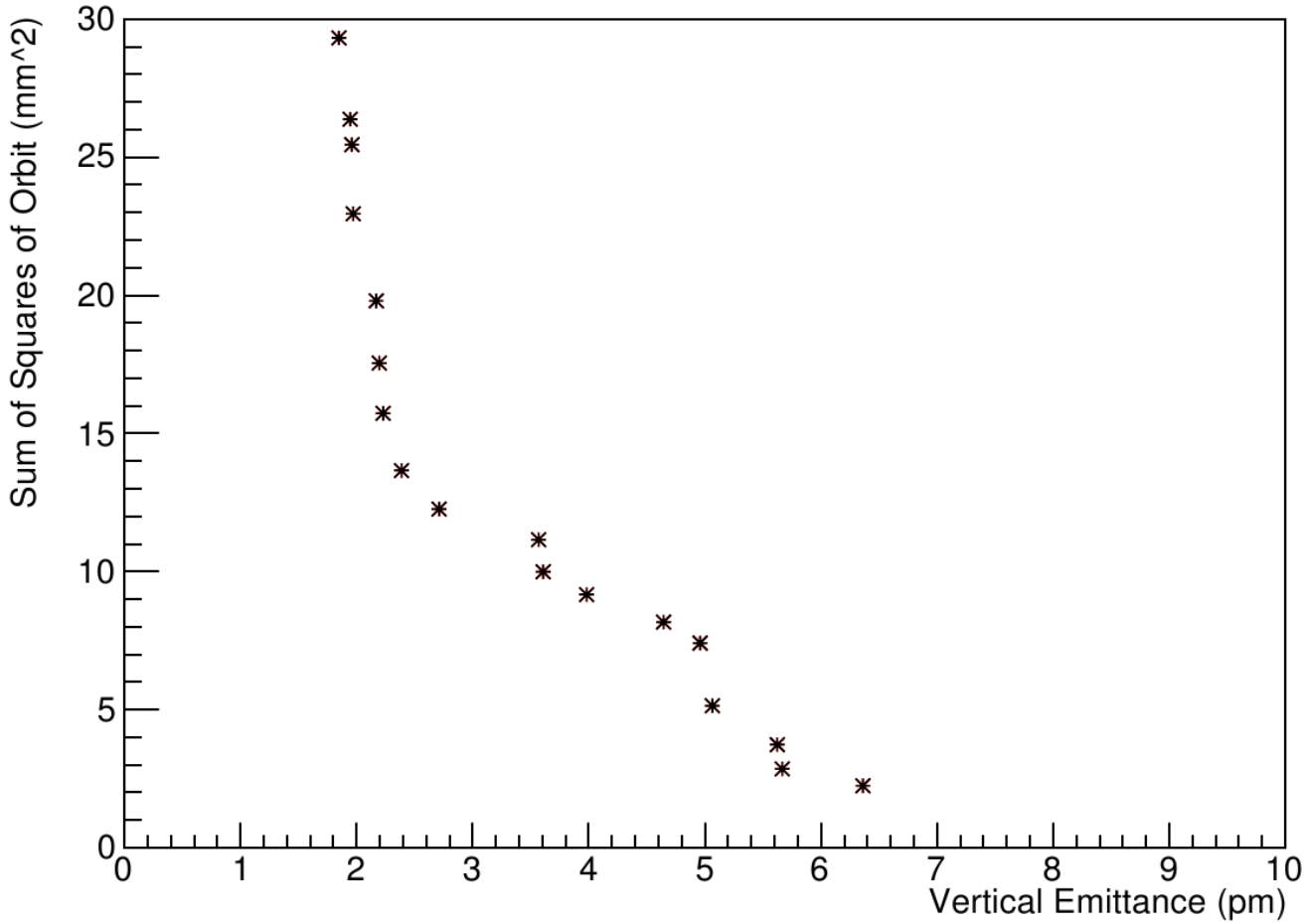
1200 Function Evaluations
30 Population (Again)



1200 Function Evaluations
20 Population



1200 Function Evaluations
20 Population (Again)



Conclusion

- Some advantage to 30 population if 600 function evaluations
- By 1200 evaluations, no significant advantage is distinguishable

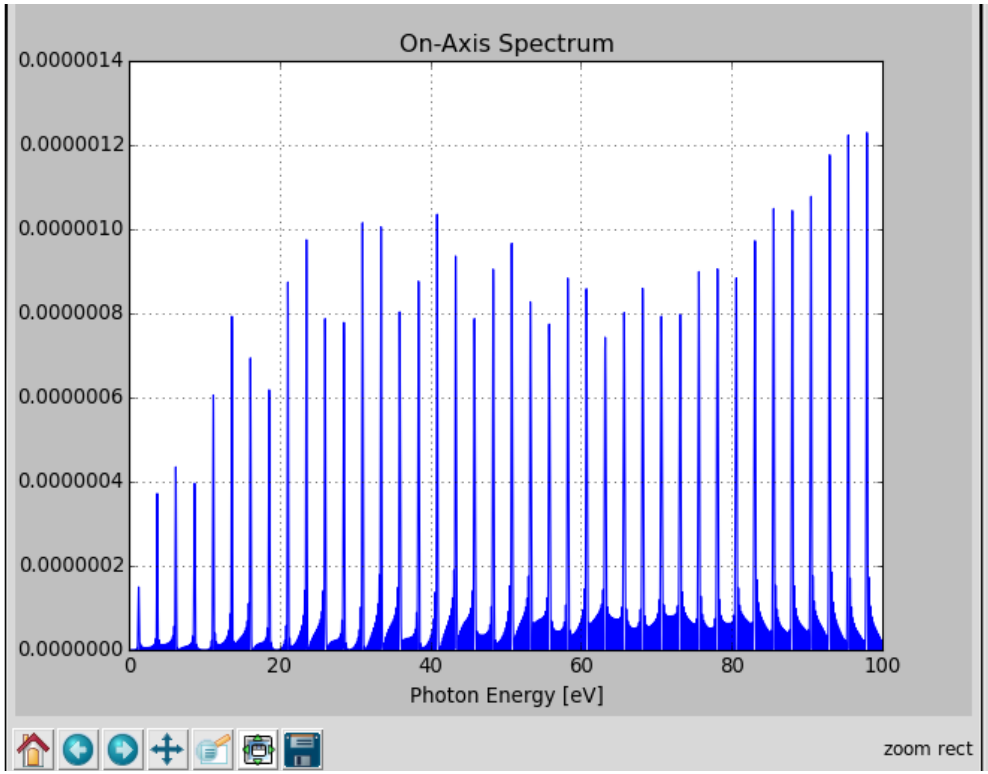
Orbit Shift Effects

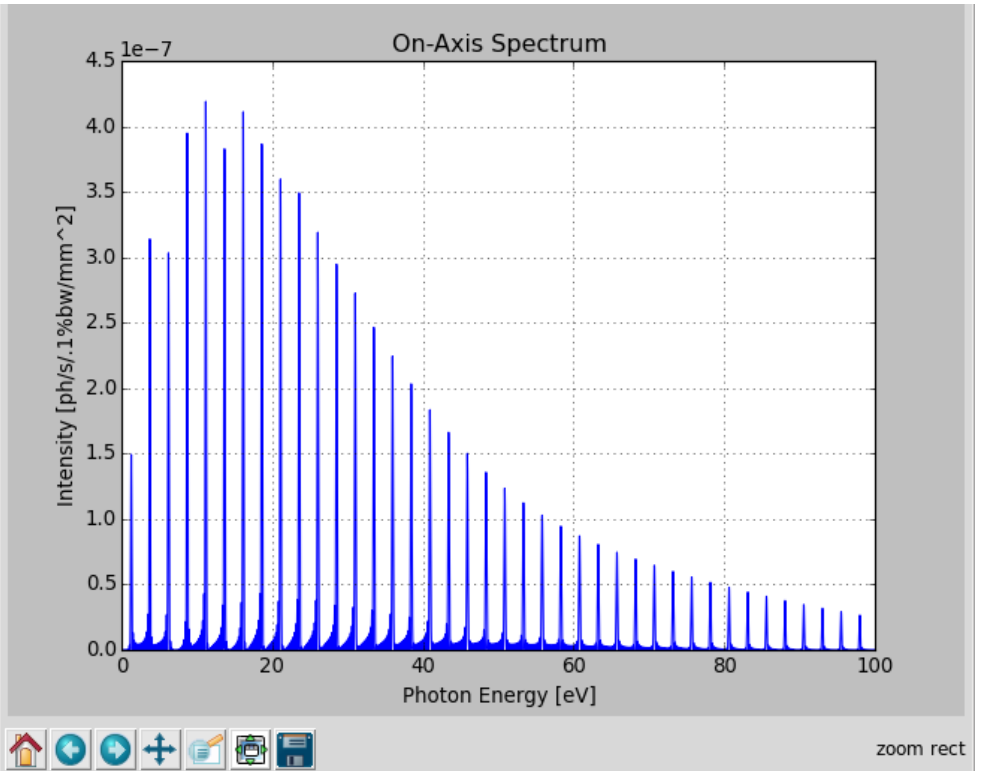
- In cesrv, changed a few kickers so as to give ~100 microns of orbit shift

- Beam size changes by fraction of micron

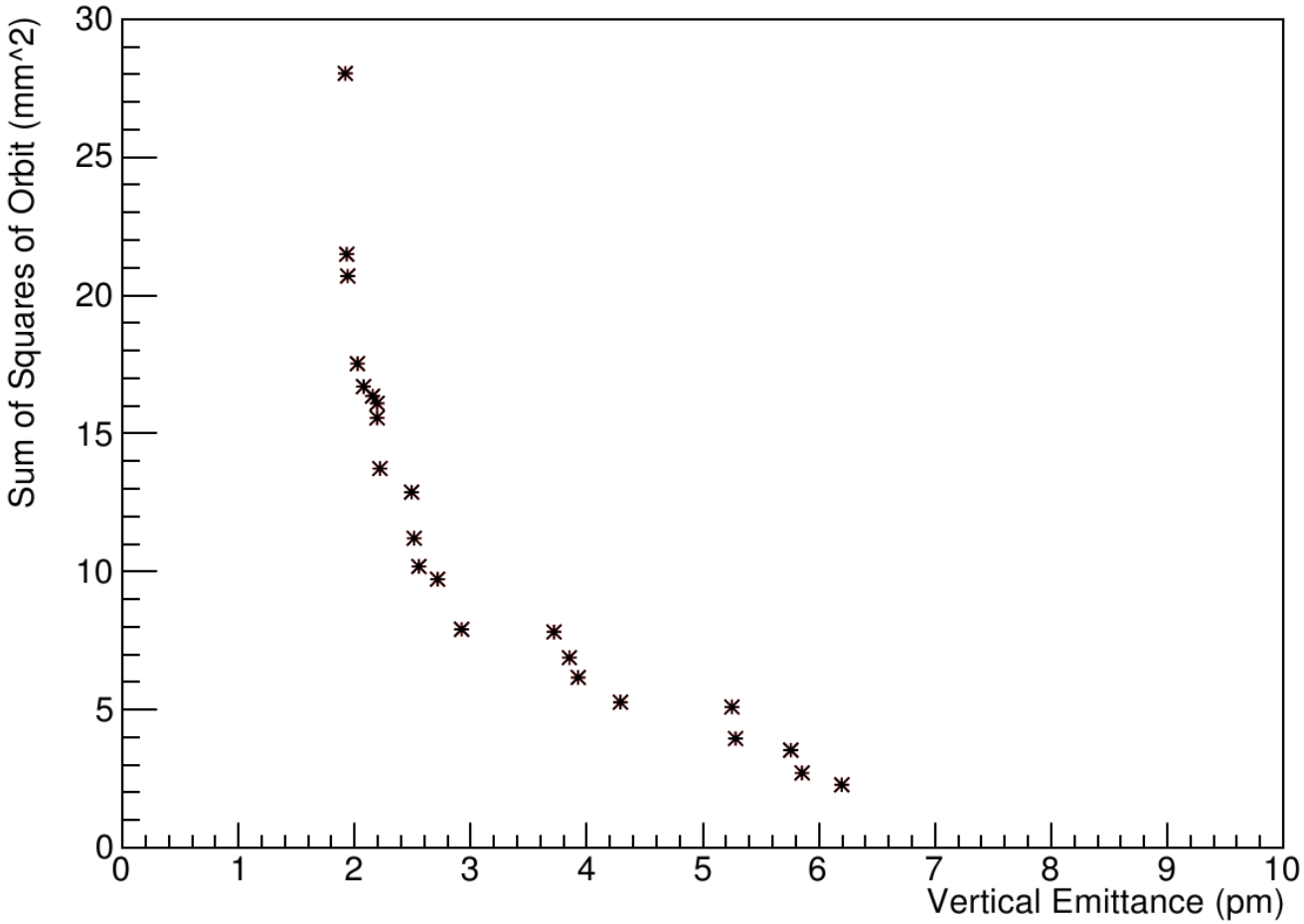
Backup Slides

1 GeV (Left) and 500 Mev (Right) On-Axis Spectra, 1 e-/sec, at 20m

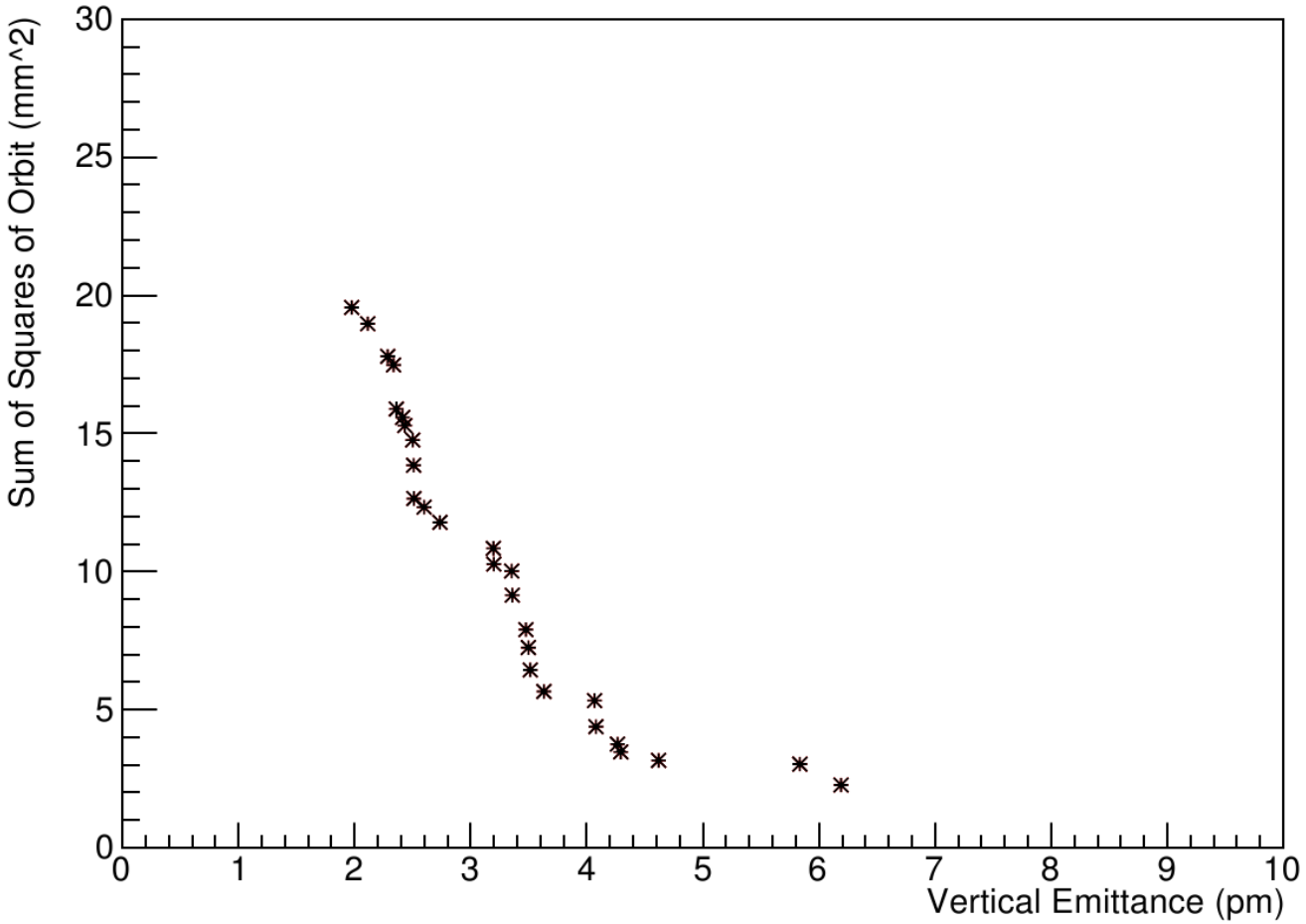




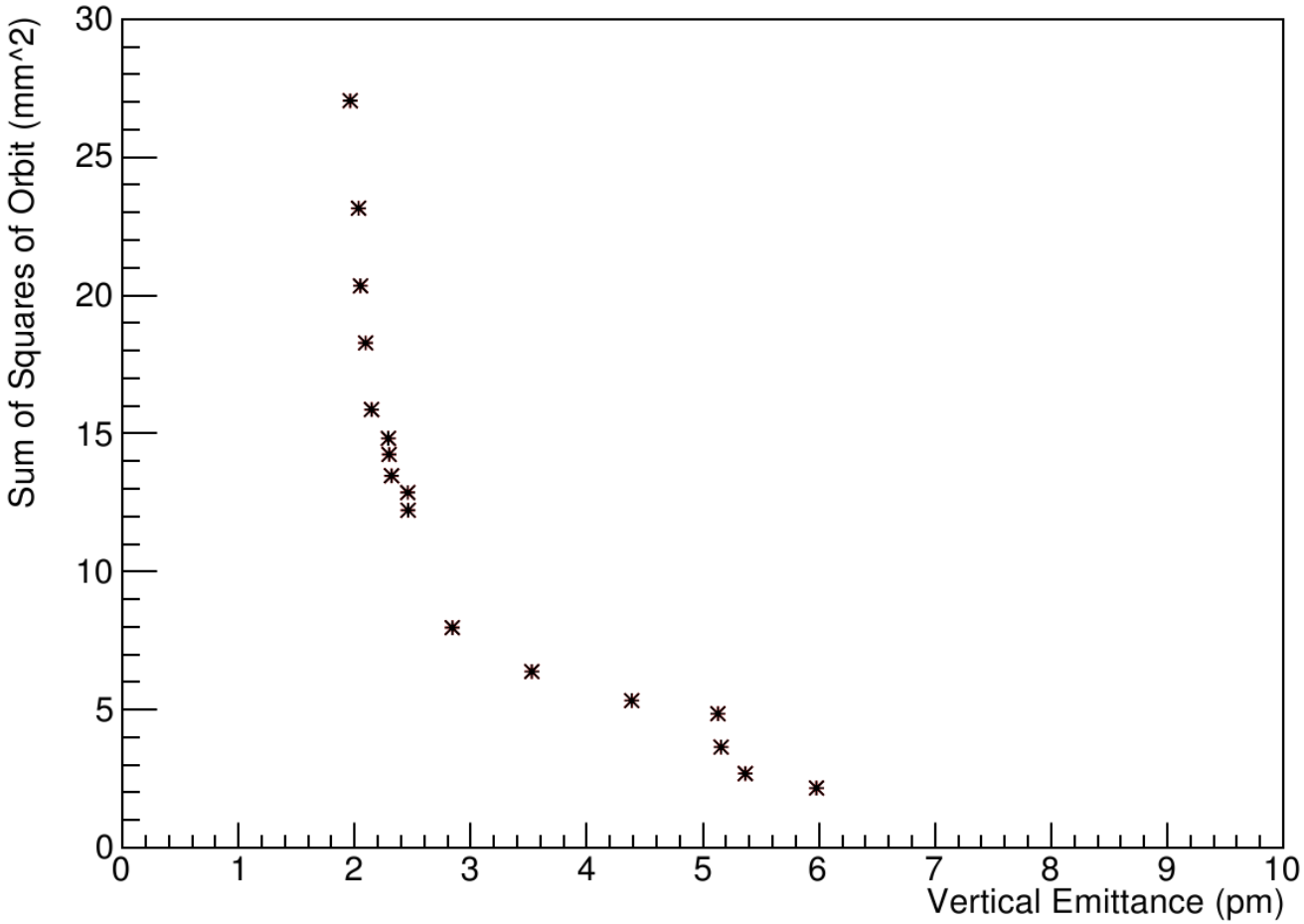
1800 Function Evaluations
30 Population



1800 Function Evaluations
30 Population (Again)



1800 Function Evaluations
20 Population



1800 Function Evaluations
20 Population (Again)