

OSC Radiation Update

- Convergence of SRW, Lienerd-Wiechert code, Lebedev's predictions

SRW Errors

- Need to include lower frequencies at lens off-axis
- When focused, these contain nontrivial phases relative to electron at constant velocity
- Also include extra term for electron's longitudinal oscillation

Results (Put 1st lens 4 m away)

	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

Notes on Lens Sizes

- Lens size is important – $K/\gamma = 3.3 \cdot 10^{-3}$
- At 4m, lens should have diameter ~ 2.7 cm
- At 6m, lens should have diameter ~ 4 cm

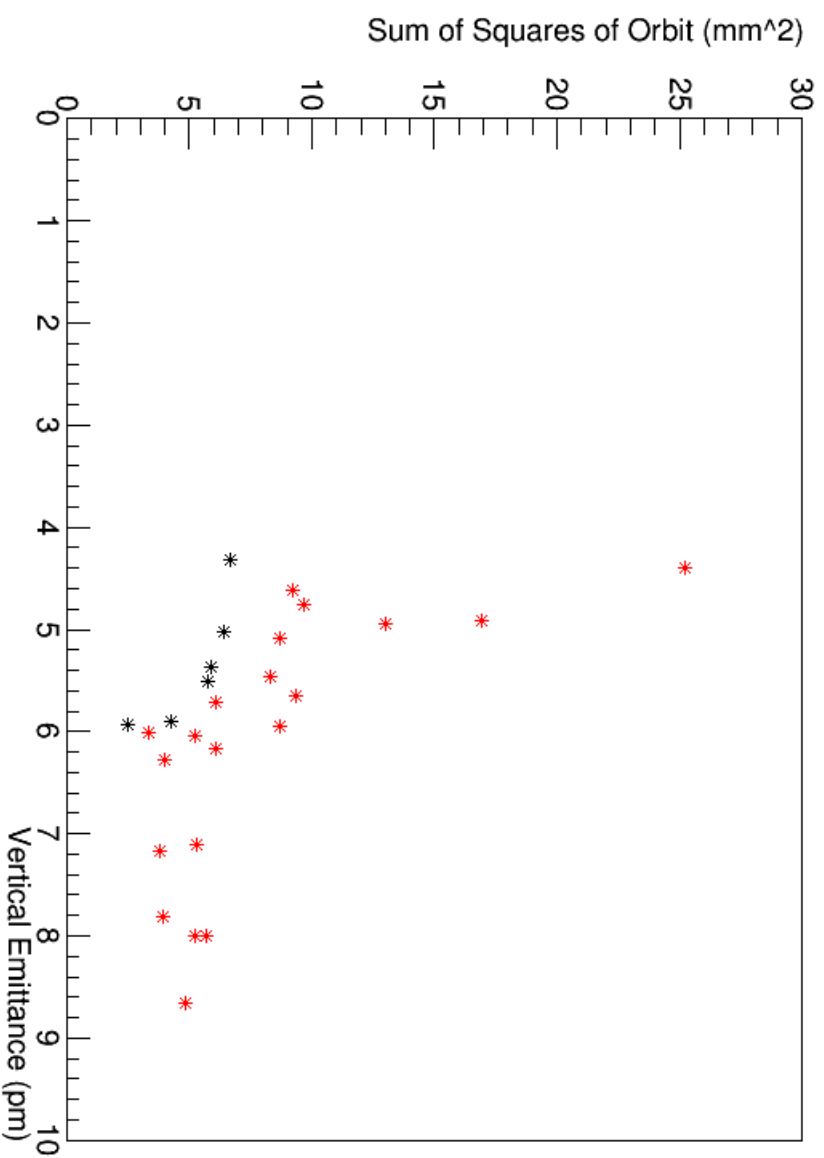
Future

- Importance of off-axis fields
- All calculations treat electron and radiation in phase – really, they differ by $\sim\pi/2$ – does this impact the effect of longitudinal oscillations?

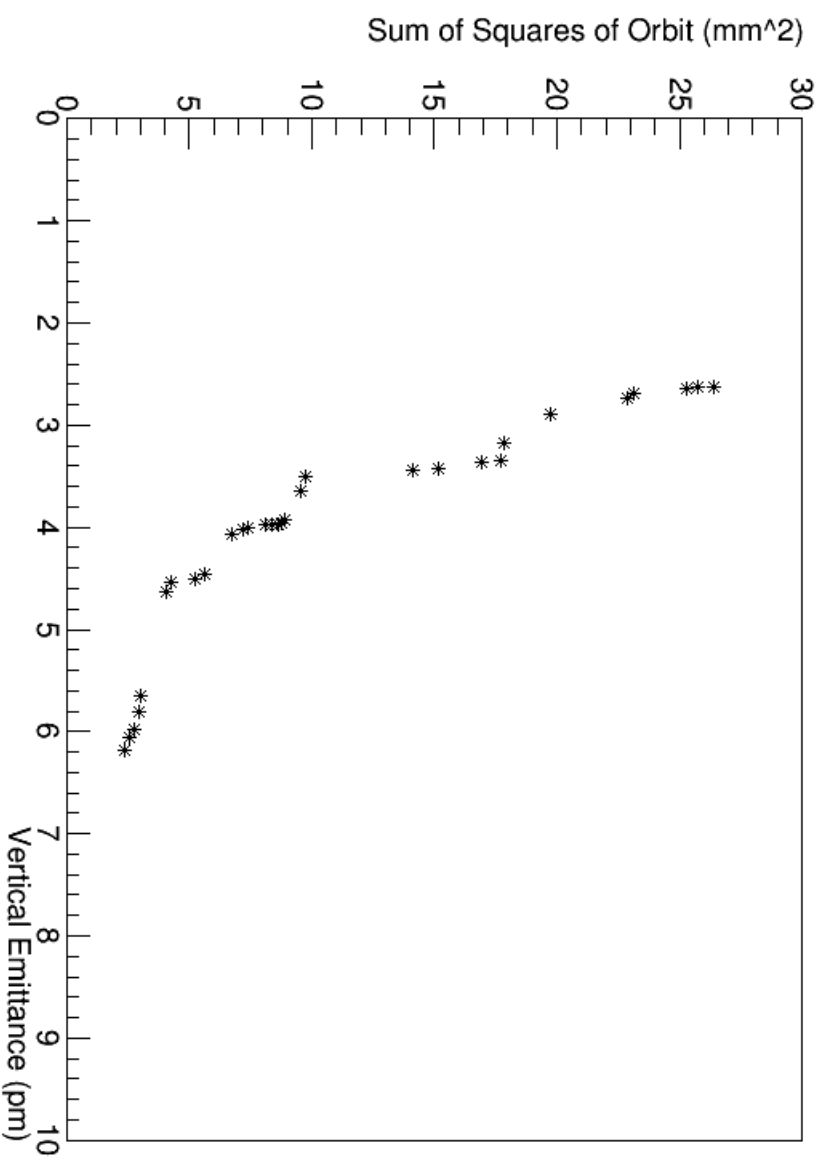
Genetic Algorithms Updates

- Eventual convergence using raw magnets
- Seeding with 8-knob solution as well as Jim's
- Using only 8-knob subspace

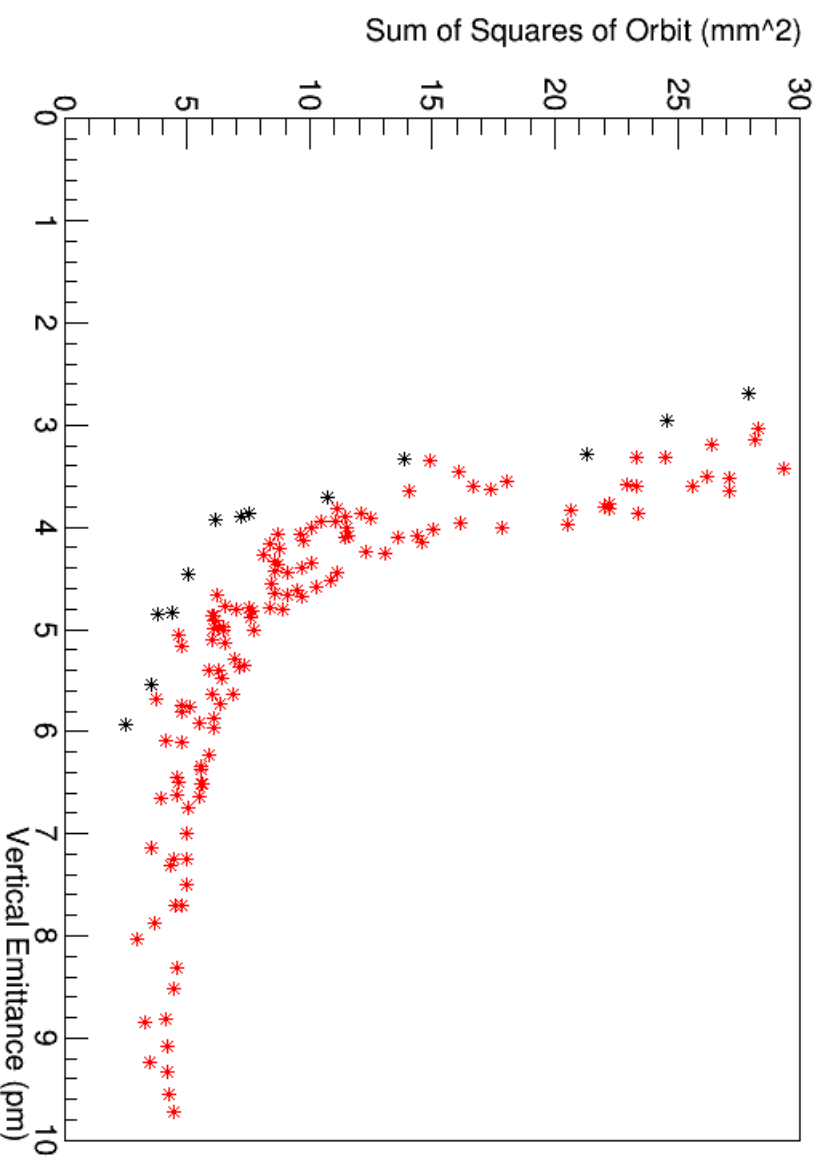
30 Generations Distribution Raw Magnets



30 Generations Distribution Knobs

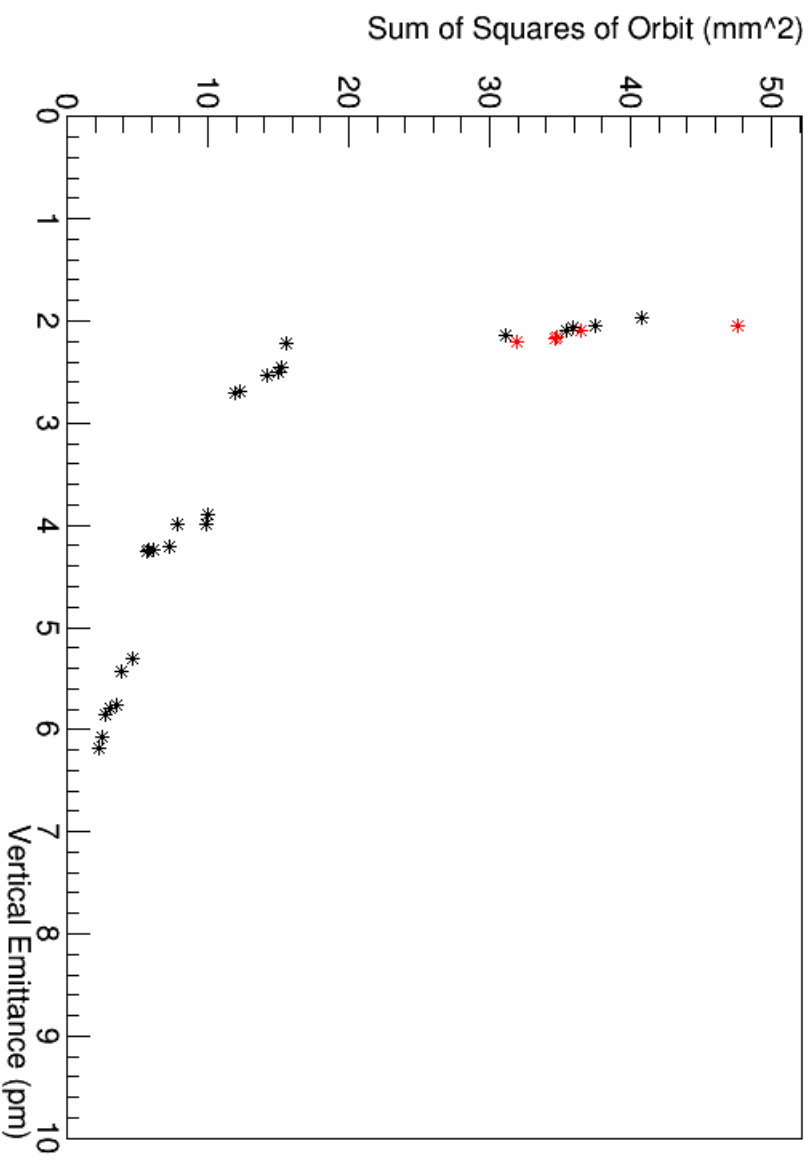


70 Generations Distribution Raw Magnets (160 population)

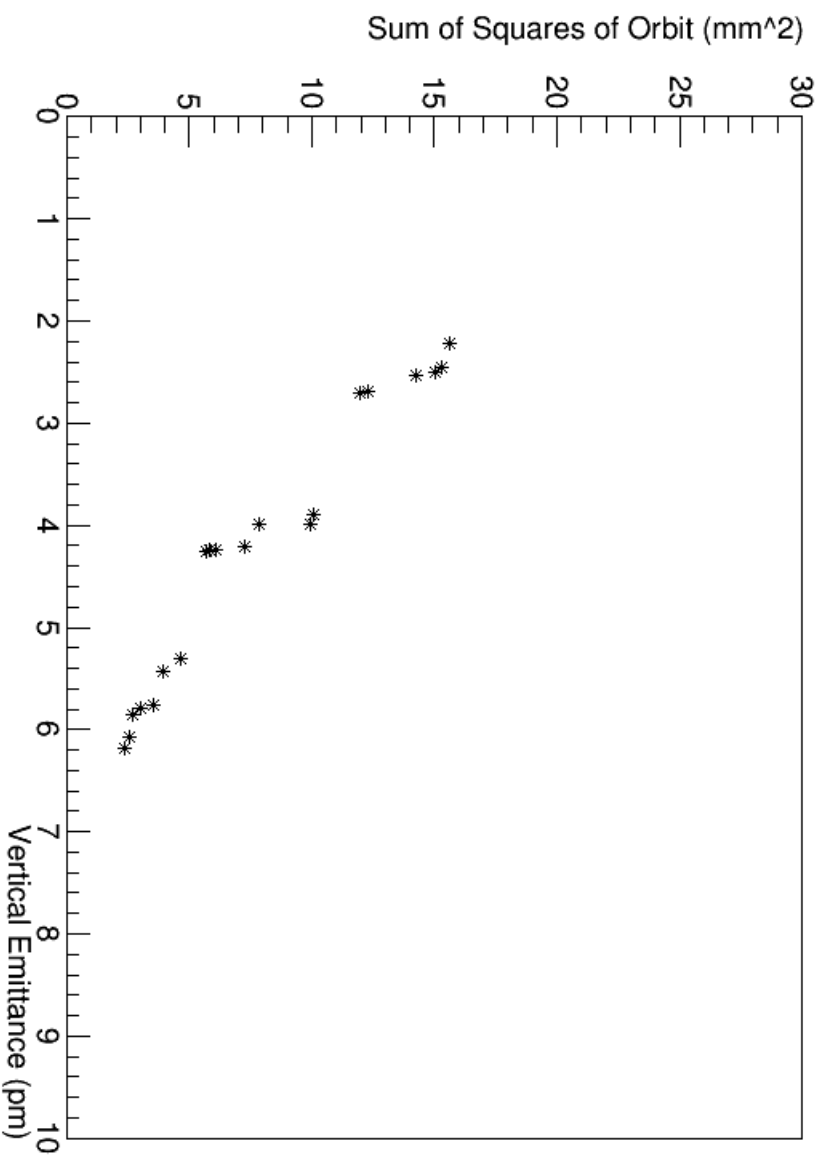


Seed with 8-Knob Solution

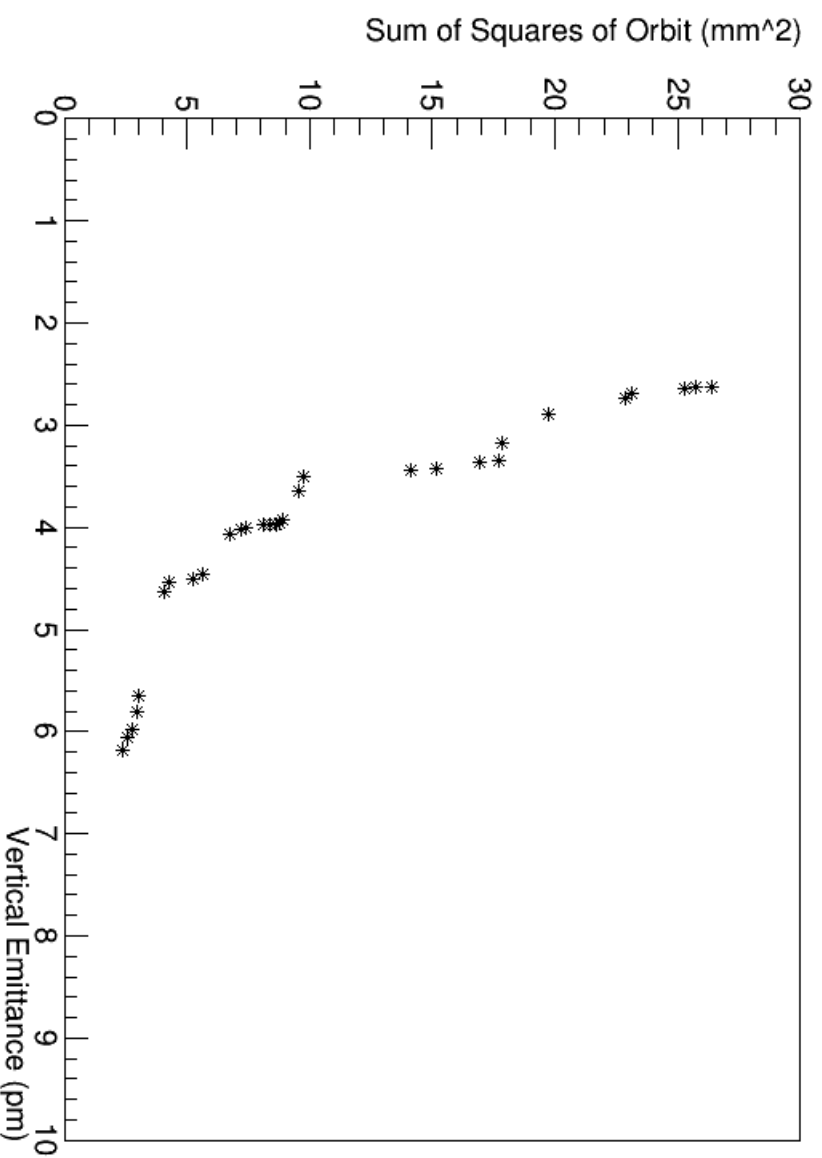
Knobs



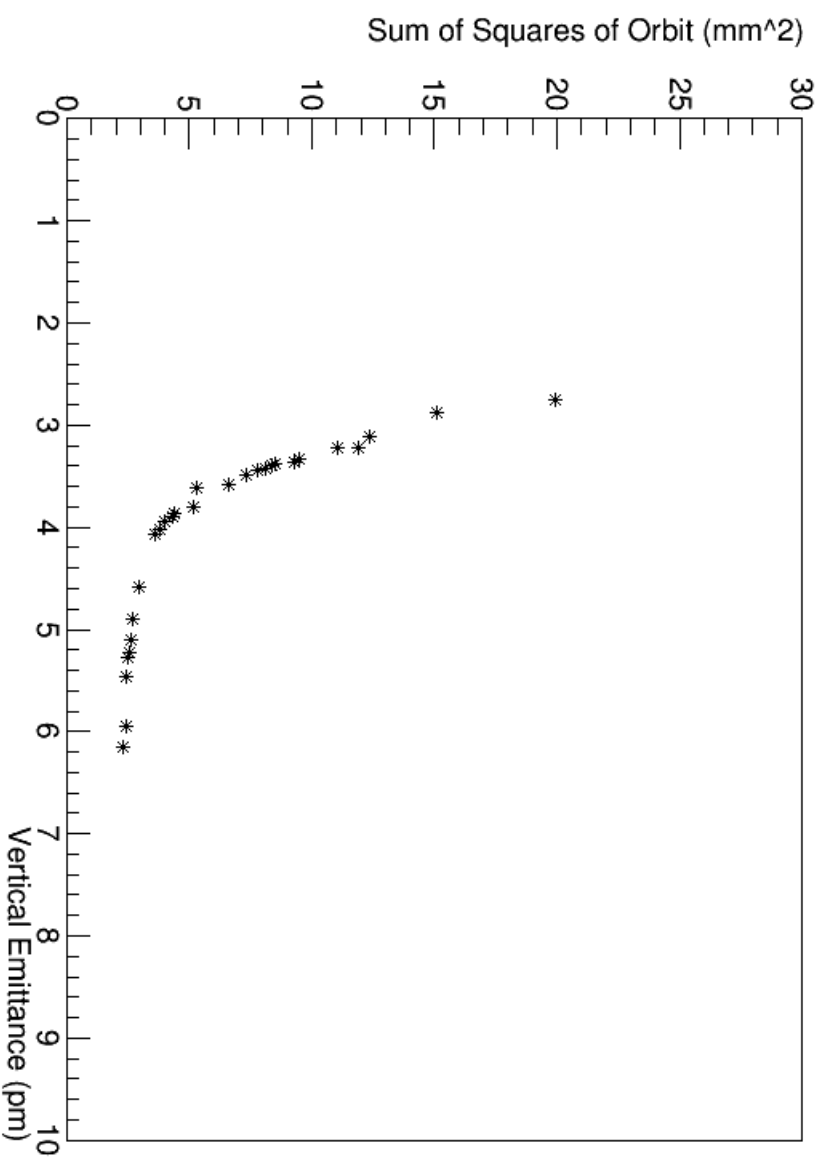
Seed with 8-Knob Solution Knobs, Zoomed-in



30 Generations Distribution Knobs (for Comparison)

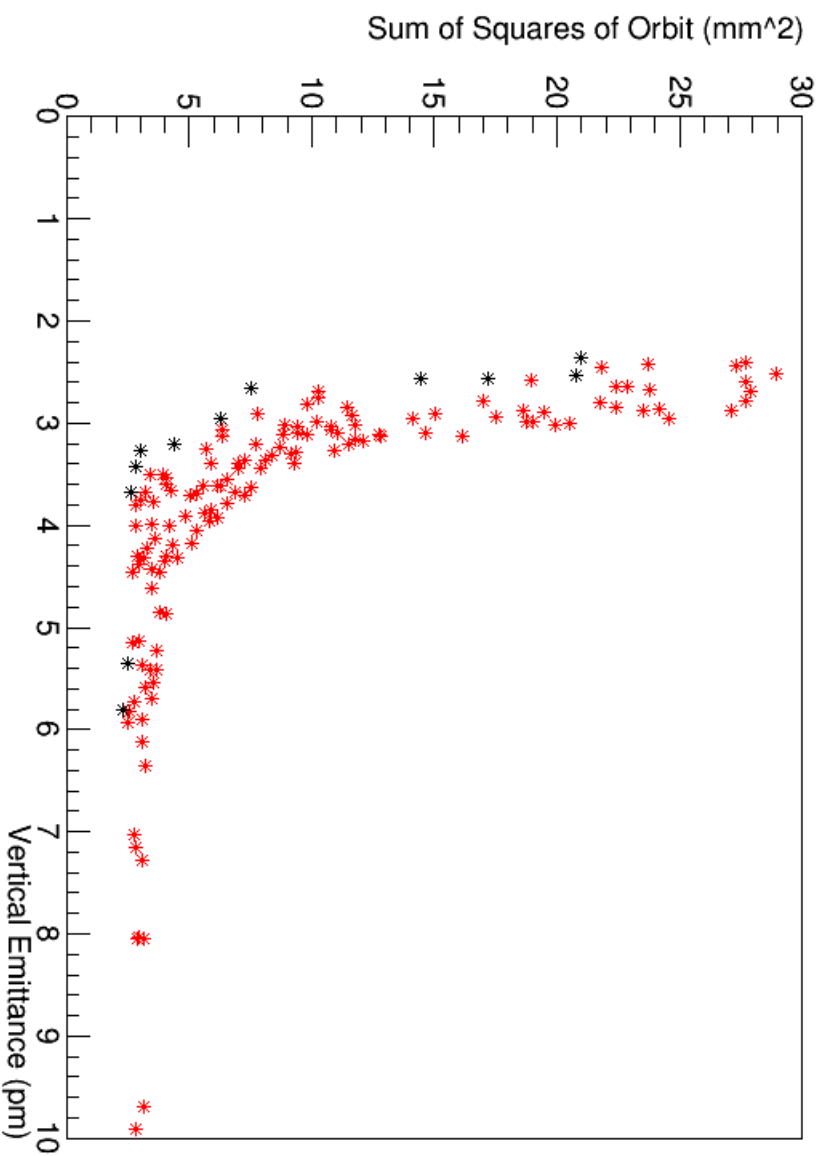


30 Generations Distribution 8-Knob Subspace



Backup Slides

150 Generations Distribution Raw Magnets (160 population)



30 Generations Distribution 8-Knob Subspace, 8-Knob Seeded

