

OSC Updates

- More accurate helical undulator radiation – electron has helical motion too
- Further sanity checks (off-axis radiation at lens and total radiation before and after lens – both in 1st harmonic)

Helical Undulator (Fully On-Axis)

	Peak Field (V/m)	Energy Transfer (meV)
4 0.45 m periods K = 3.55	43 (SRW) 46 (LW)	156 (SRW) 152 (LW)
6 0.3 m periods K = 4.41	50 (SRW) 52 (LW)	212 (SRW) 212 (LW)
8 0.225 m periods K = 5.12	54 (SRW) 56 (LW)	254 (SRW) 266 (LW)

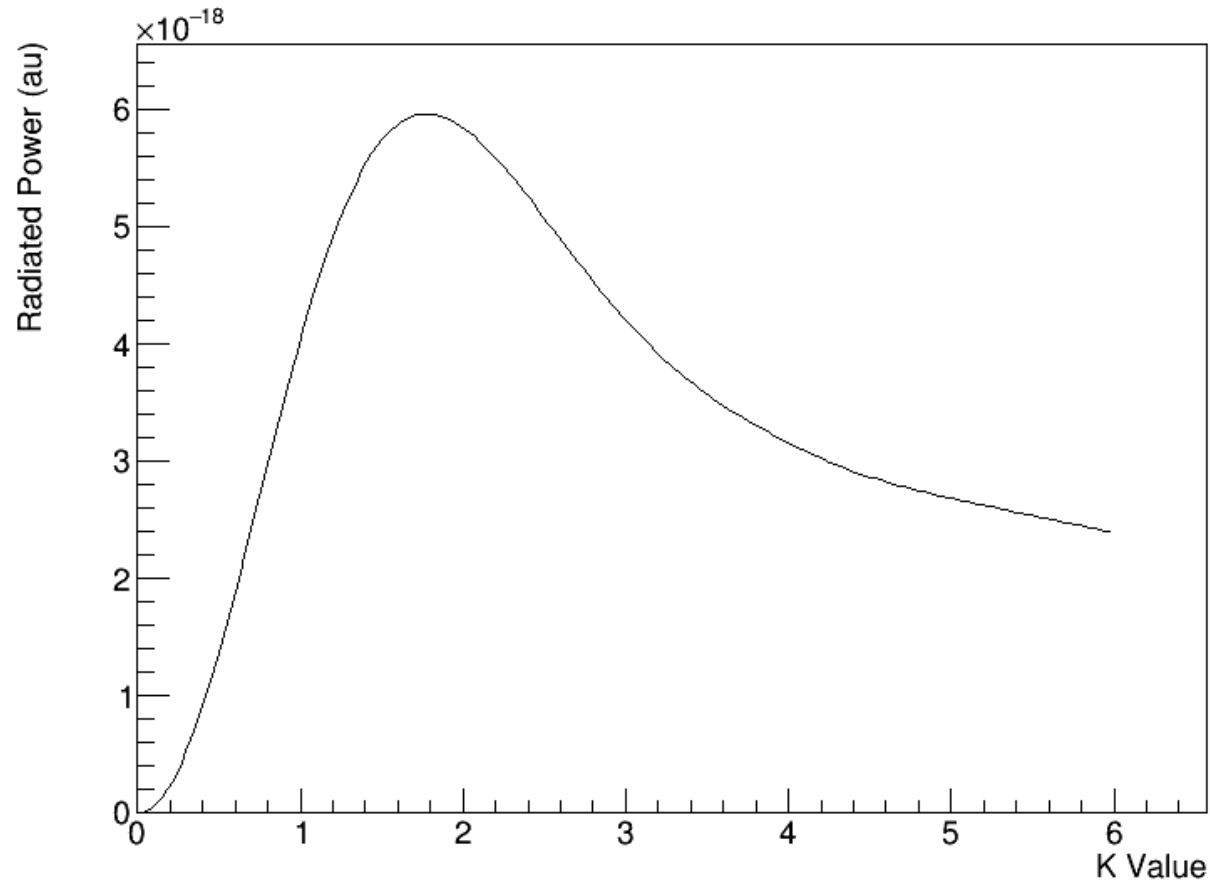
(telescope, square lens, 16mm/side,
1 GeV, 800 nm wavelength)

Helical Undulator (Real e- Positions)

	Peak Field (V/m)	Energy Transfer (meV)
4 0.45 m periods K = 3.55	39 (SRW)	127 (SRW)
6 0.3 m periods K = 4.41	46 (SRW)	177 (SRW)
8 0.225 m periods K = 5.12	50 (SRW)	225 (SRW)

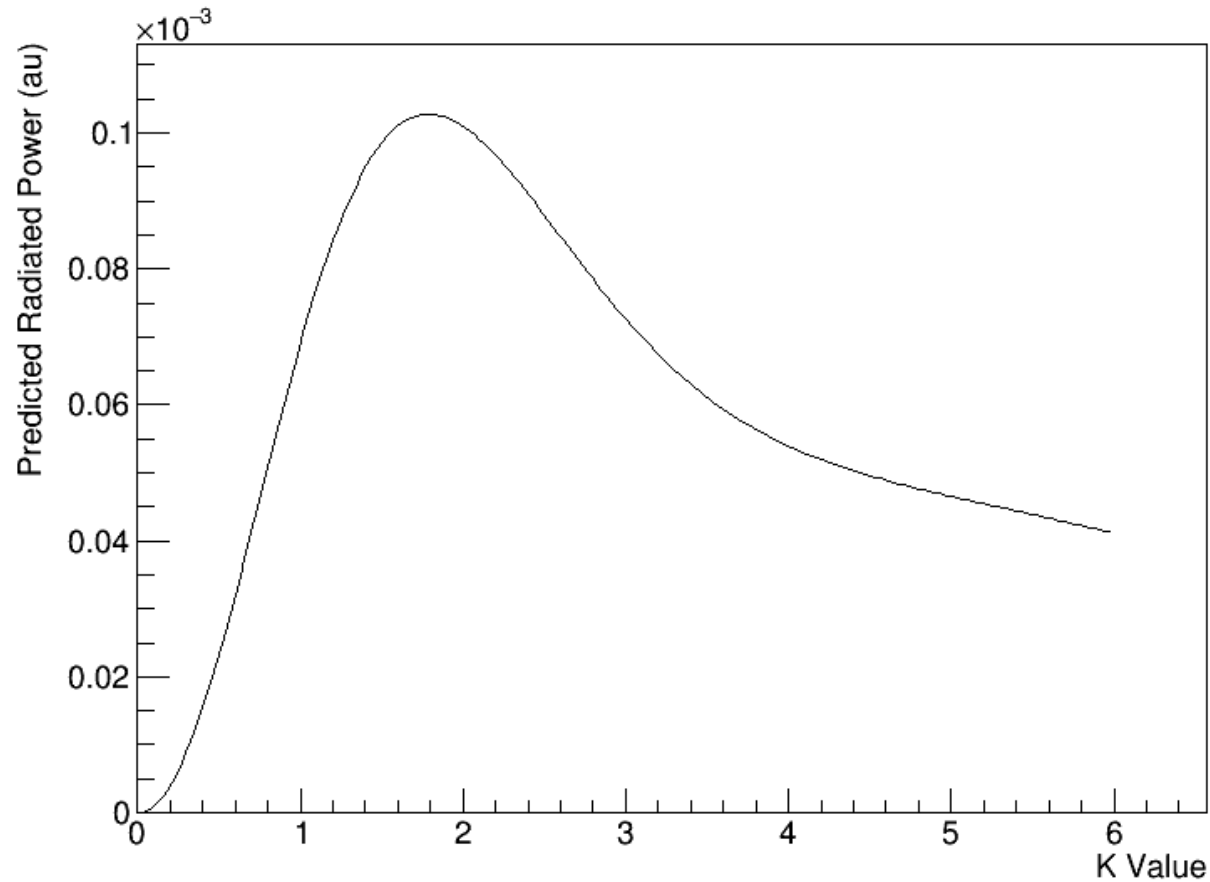
(telescope, square lens, 16mm/side,
1 GeV, 800 nm wavelength)

Off-Axis Helical Undulator Energy/e- vs K Value



Plot is for Lienerd-Wiechert code

Off-Axis Helical Undulator Energy/e- vs K Value



Plot is for Kincaid's formula

Radiation Before and After Lens Integrated over Area, per e-

- In 1st harmonic, SRW predicts (units of field²):
- K=5.12: 0.97e-10 before lens and 1.00e-10 at focus
- K=3.55: 1.12e-10 before lens, 1.17e-10 at focus
- Conclude that better focusing with high K, small period