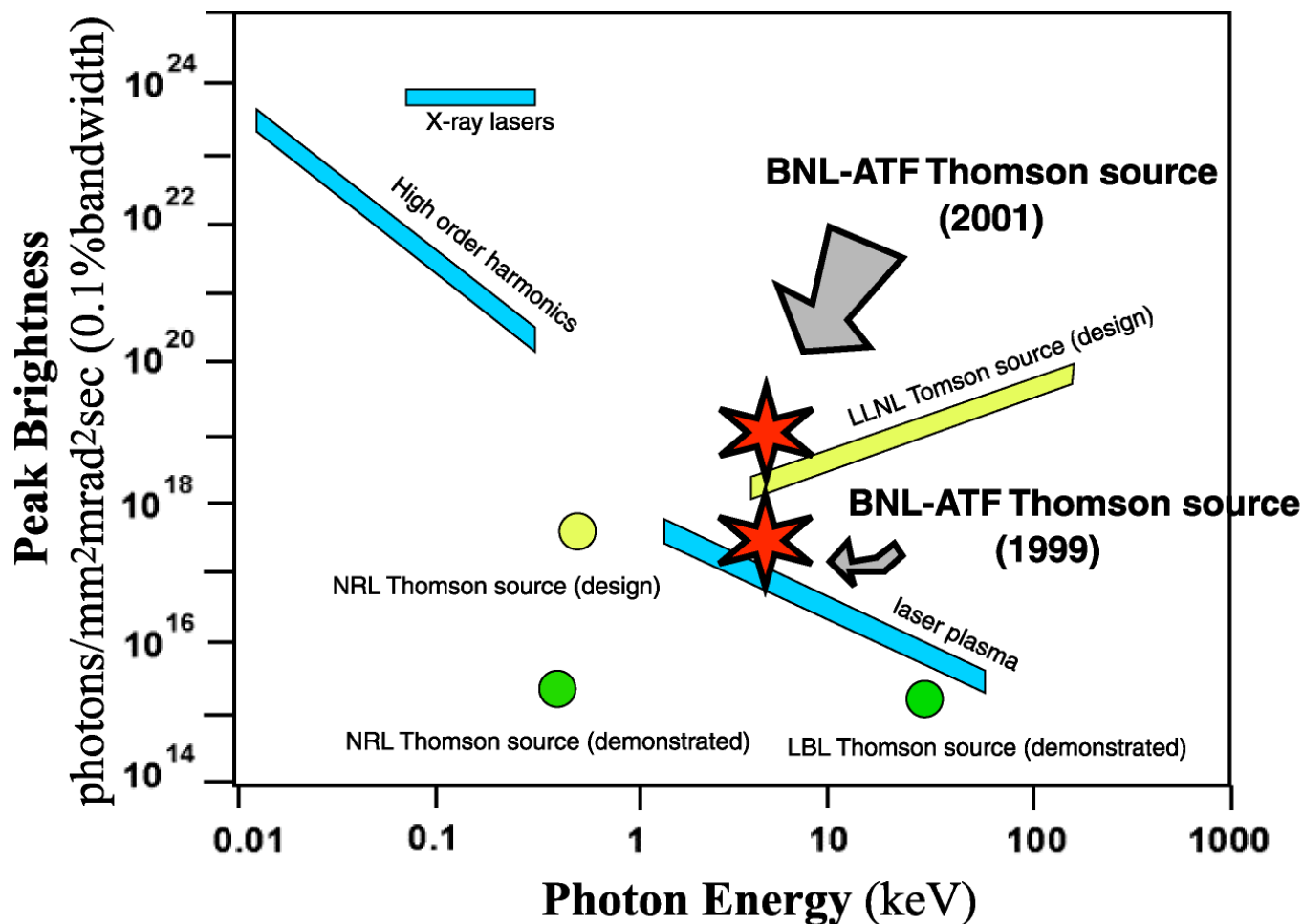
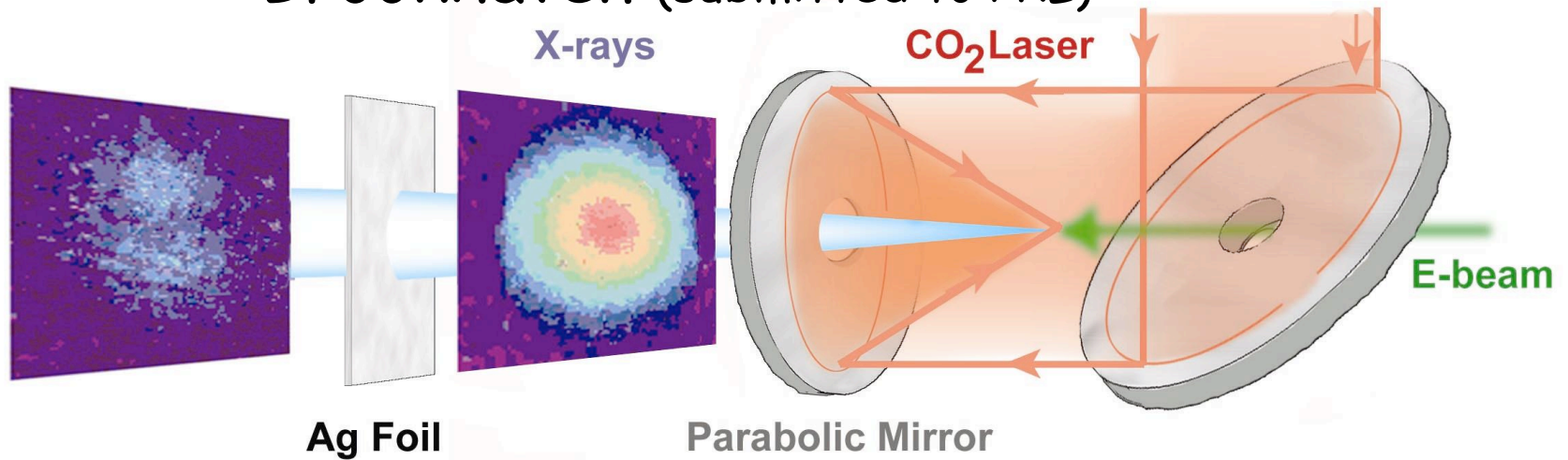


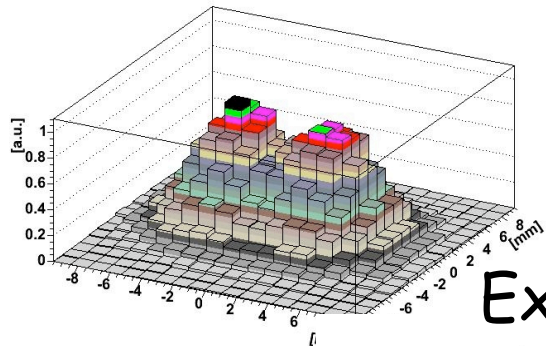
Compton Scattering of Picosecond Electron and CO₂ Laser Beams



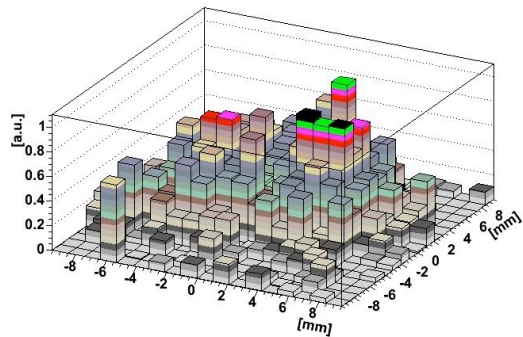
Nonlinear Compton Scattering at ATF, Brookhaven (submitted to PRL)



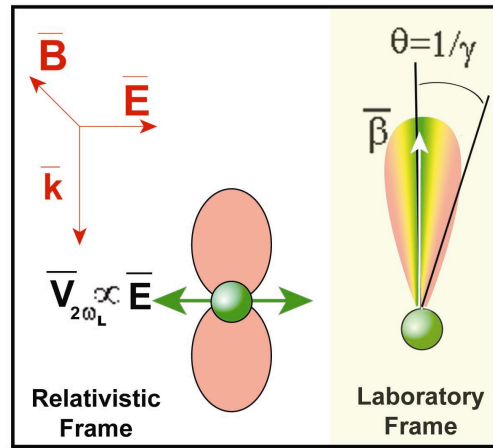
Simulations



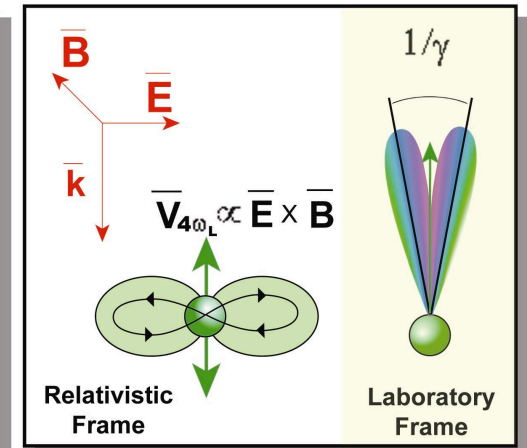
Experiment



First Order Fundamental Radiation



Second Order Harmonic Radiation



Numbers and conclusions

- 60 MeV e-beam 0.5nC, 50 μ m RMS (to minimize background), 3.5ps
- CO₂ laser, sub-terawatt at IP, $a_0 \sim 0.3$ 5J
30ps, 30 μ m
- $2 \cdot 10^7$ x-rays @ up to 6.5KeV per pulse ($>10^8$ x-rays in high background mode)
- 2.5% in the second harmonic >10 keV after 10 μ m Ag foil
- Rotation of the laser polarization leads to rotation of the peaks in the second harmonic
- Increase of the laser pulse duration to 200ps with the same energy eliminated nonlinear part with small change in the linear signal