

The background features a dark blue gradient with a pattern of white circular lines and arrows, suggesting a technical or scientific theme. A prominent circular scale is visible on the left side, with numerical markings from 140 to 260 in increments of 10. The scale is partially obscured by other circular patterns and arrows.

RADIATIVE CORRECTIONS FOR DVCS-3: E12-06-114

CHARLES HYDE

DVCS COLLABORATION

4 FEB 2019

RADIATIVE CORRECTIONS

- Radiative tail for emission of finite energy: Included in simulation
- Virtual Photons (Vertex, vacuum polarization)
 - Calculated with D. Lhuillier *et al.* code
 - M. Vanderhaeghen, J. M. Friedrich, D. Lhuillier, D. Marchand, L. Van Hoorebeke, and J. Van de Wiele, Phys. Rev. C **62** (2000) 025501
 - My version only has Nucleon-pole term ("Born") in VCS amplitude (<<BH) from P.A.M. Guichon.
- Radiation of photons below the resolution scale
 - Correction factor $exp[-\delta_{R,El}^0]$

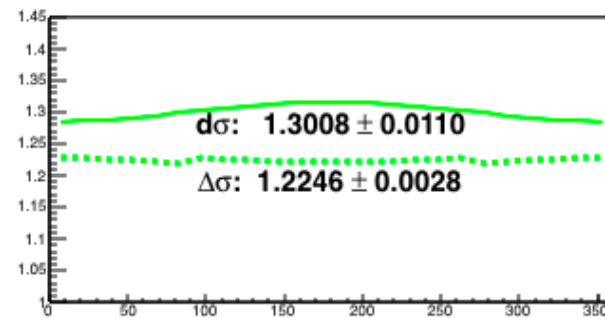
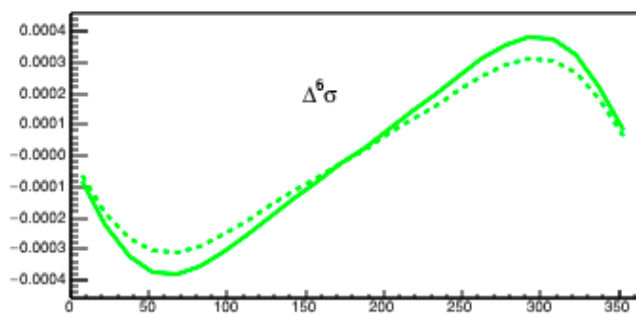
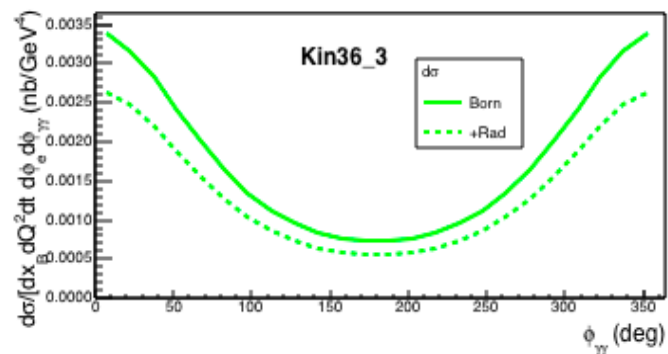
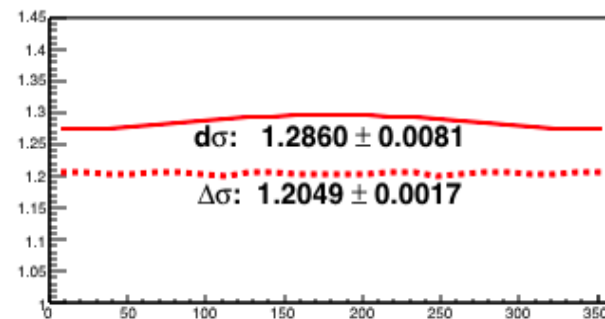
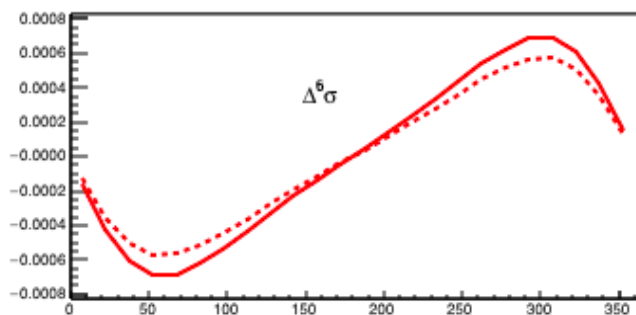
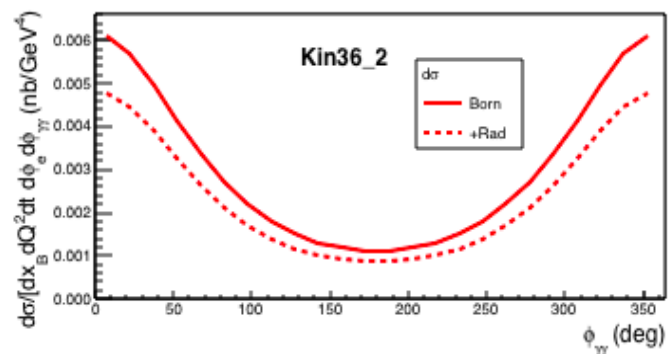
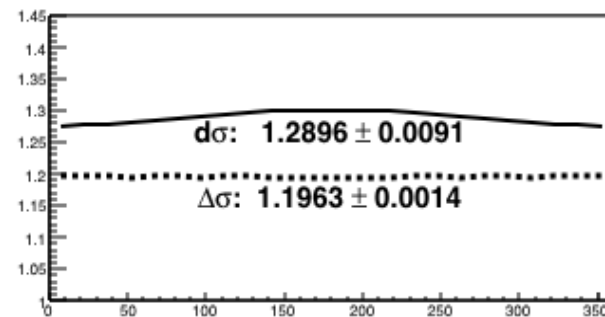
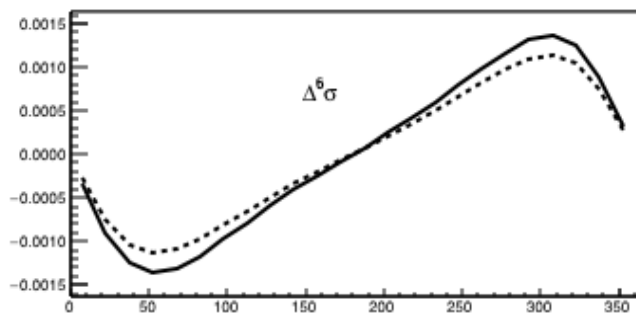
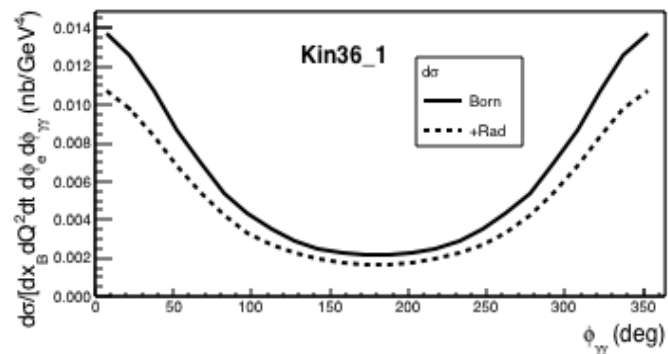
$$\delta_{R,El}^{(0)} = \frac{\alpha}{\pi} \left[\frac{1}{2} \ln^2 \left(\frac{Q^2}{m_e^2} \right) - \frac{1}{2} \ln^2 \left(\frac{E_e'}{E_e} \right) - \frac{\pi^2}{3} + \text{Sp} \left(\cos^2 \frac{\theta_e}{2} \right) \right]$$

$$X_{BJ} = 0.36$$

- Virtual only
 $-t = 0.25 \text{ GeV}^2$

$$\text{Exp}(-\delta_R^{(0)}) = 0.737$$

$$\text{Net RadCorr} \sim 1.29 \cdot 0.737 = 0.951$$

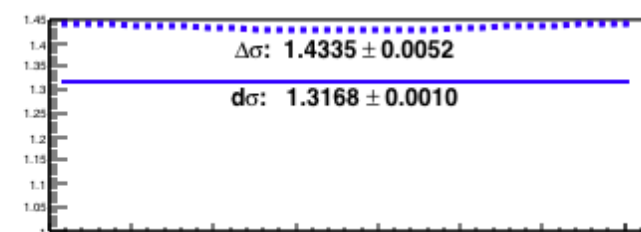
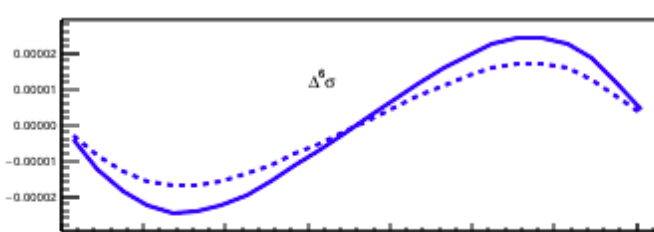
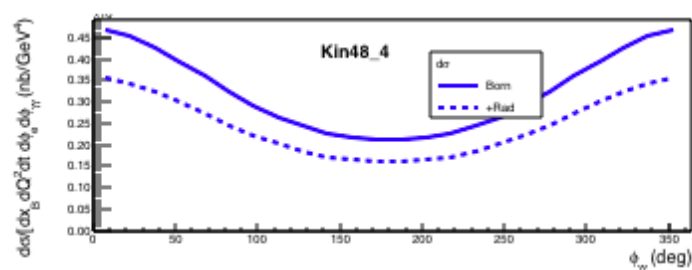
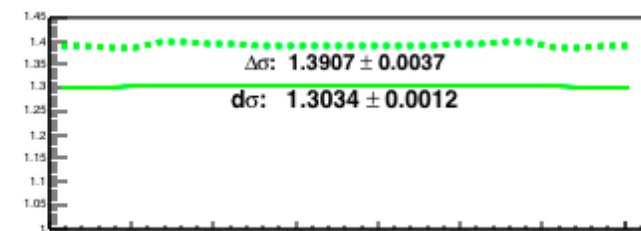
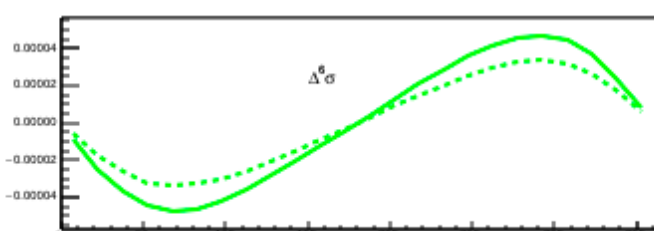
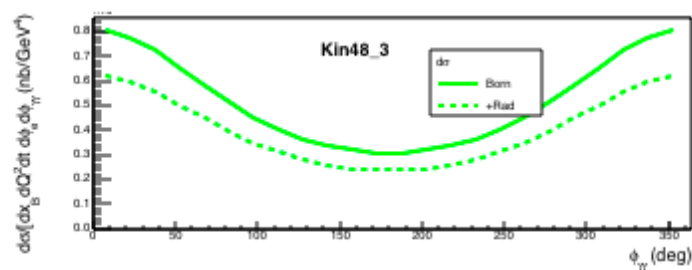
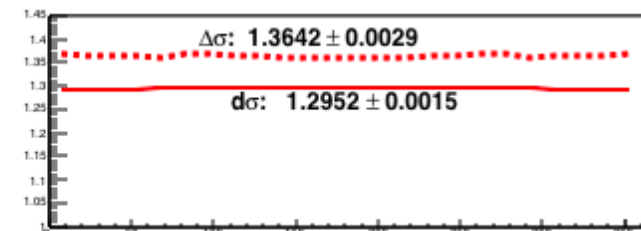
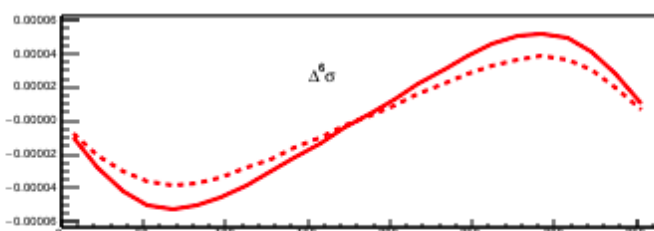
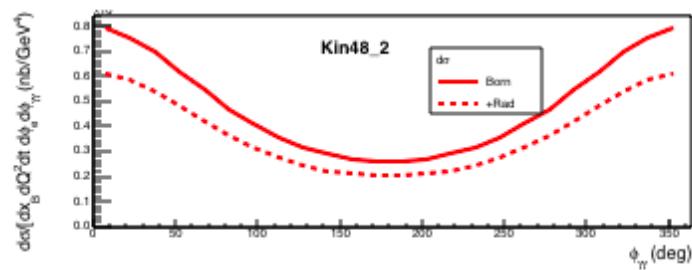
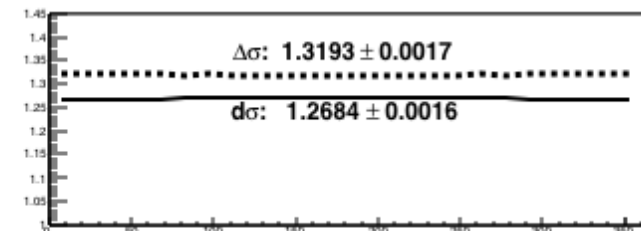
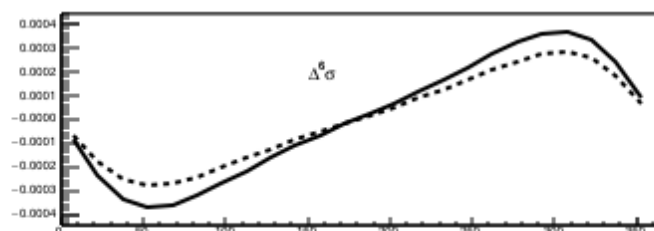
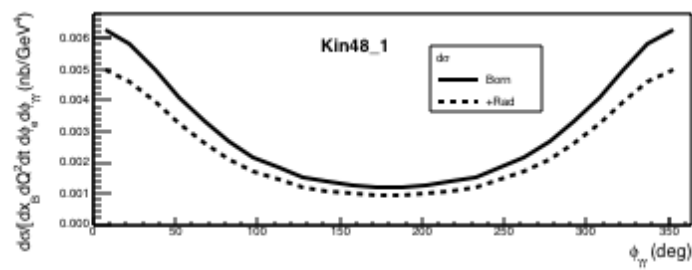


$$X_{BJ} = 0.48$$

- Virtual only
 $-t = 0.40 \text{ GeV}^2$

$$\text{Exp}(-\delta_R^{(0)}) = 0.728$$

$$\text{Net RadCorr} \sim 1.30 * 0.728 = 0.947$$

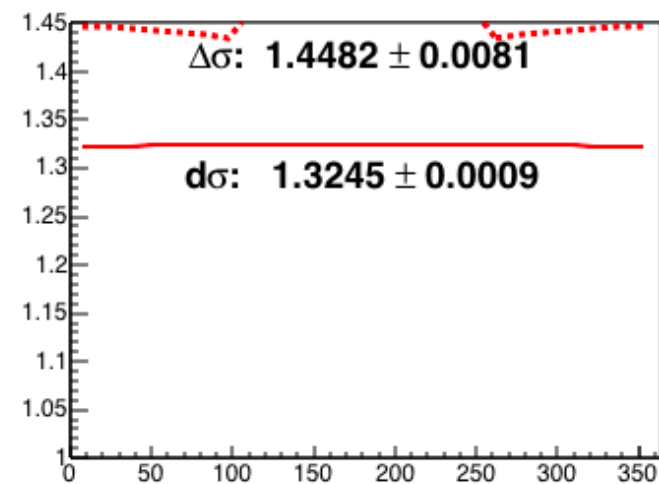
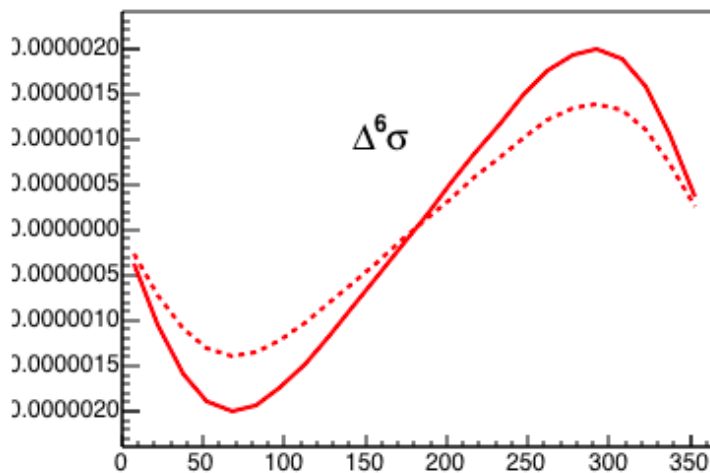
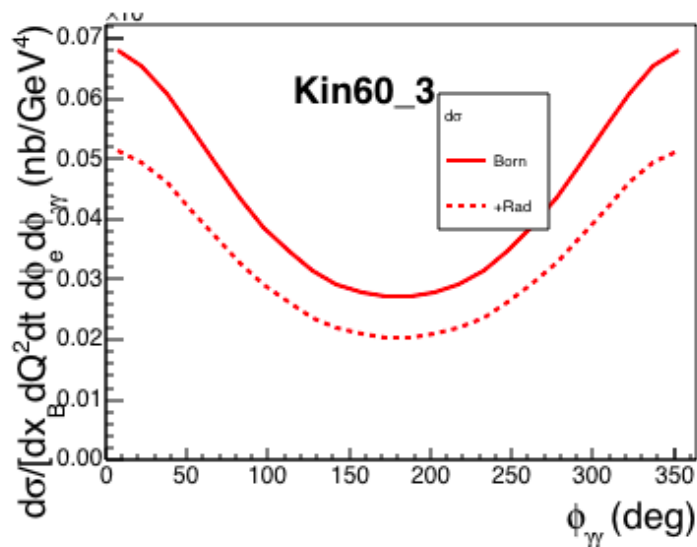
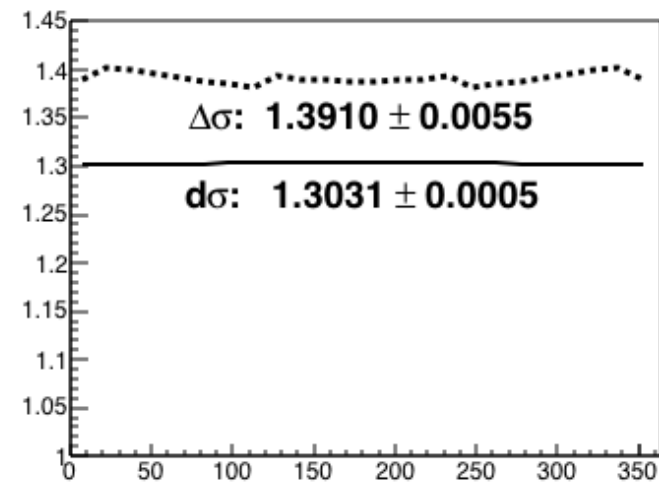
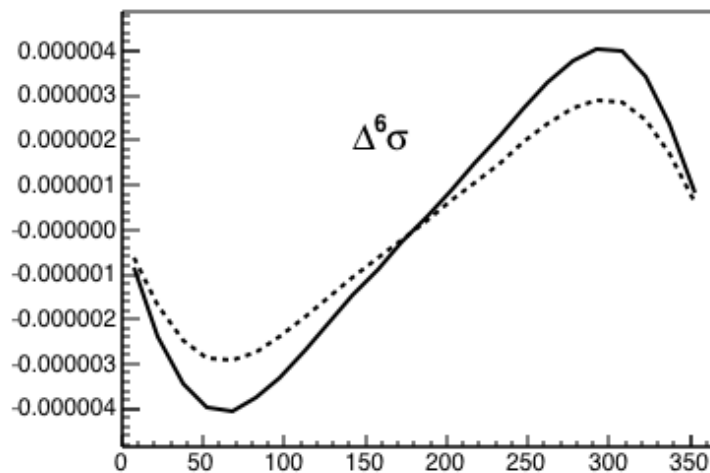
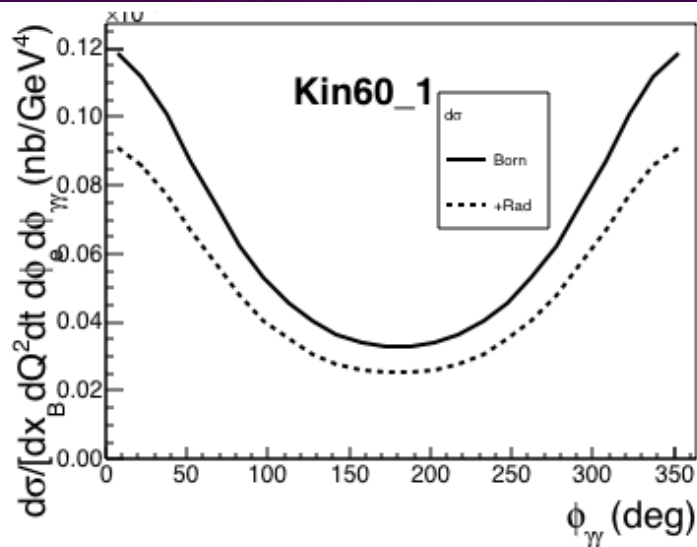


$$X_{BJ} = 0.60$$

- Virtual only
 $-t = 1.0 \text{ GeV}^2$

$$\text{Exp}(-\delta_R^{(0)}) = 0.722$$

$$\text{Net RadCorr} \sim 1.31 \cdot 0.722 = 0.945$$



UNRESOLVED ISSUES

- Compare with analytic results
- Corrections are different for BH and VCS amplitudes (but independent of form of VCS)
- Corrections are ambiguous when $|BH|^2$, $[DVCS*BH]$, and $|DVCS|^2$ all appear.
 - In these calculations, $d\sigma = \text{pure } |BH|^2$, $\Delta\sigma = \text{pure } [DVCS*BH]$