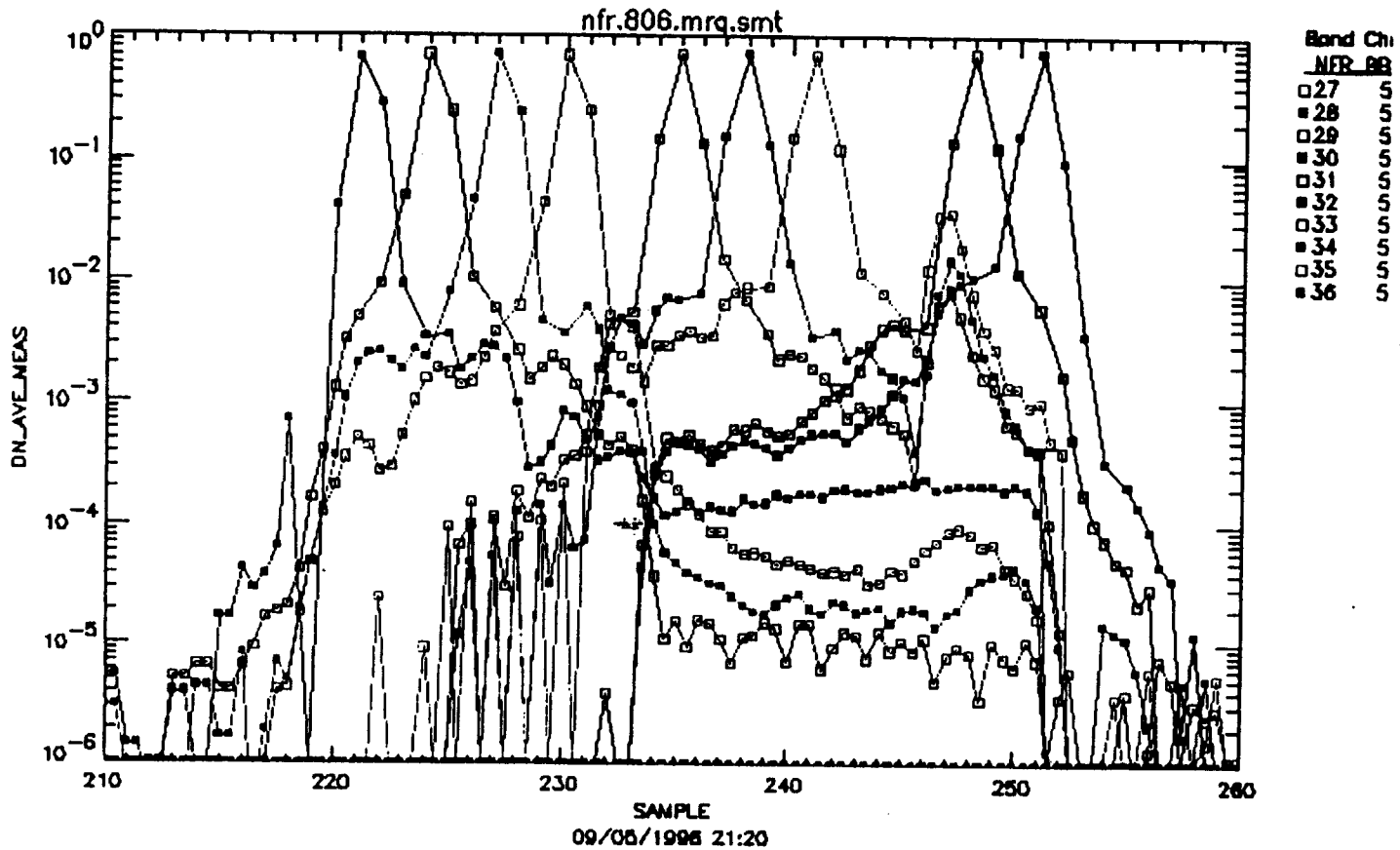


7.0 PC Bands Crosstalk

(parametric assessment of B31
crosstalk color temperature effect)

Near Field Response Test Results

Figure 1 shows the results of near field response (NFR) testing for the LWIR bands. The data shown are plotted on a logarithmic scale.



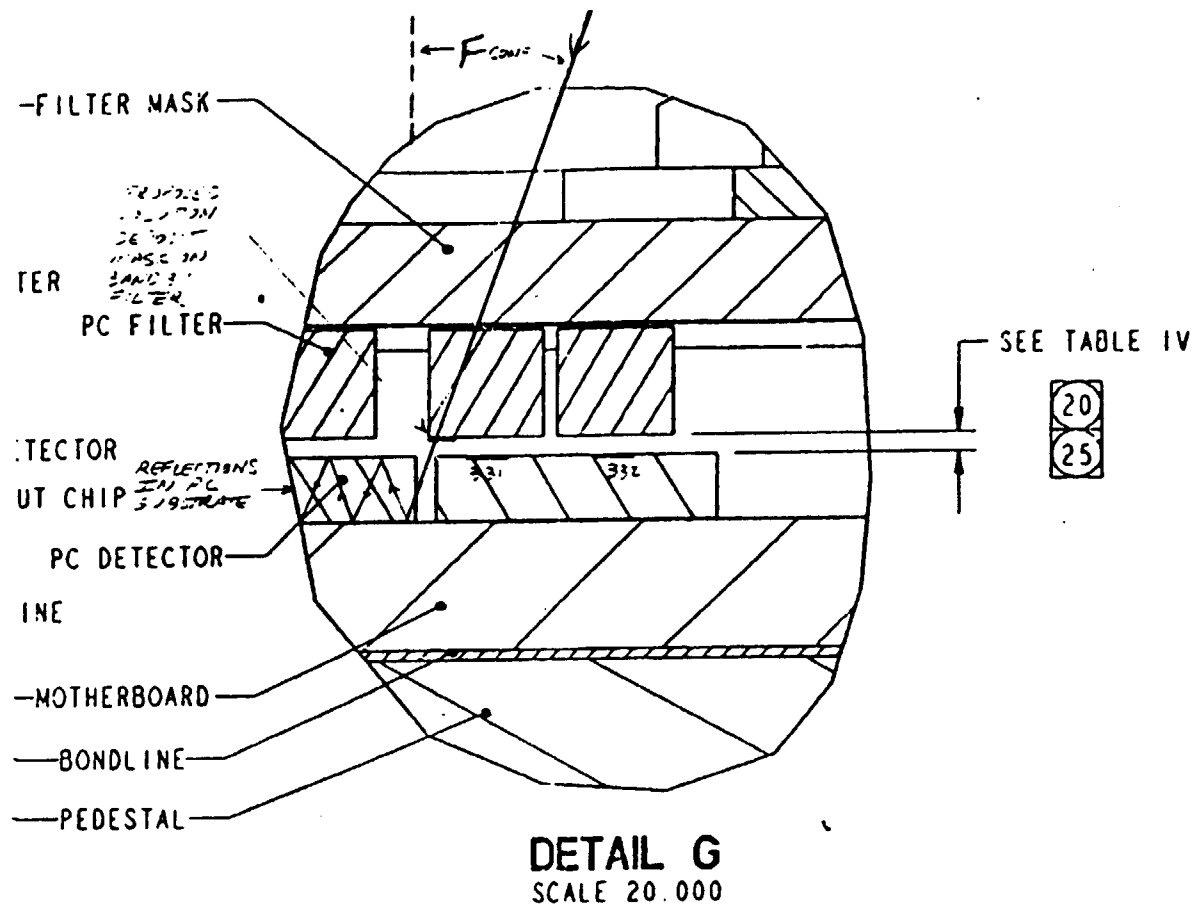
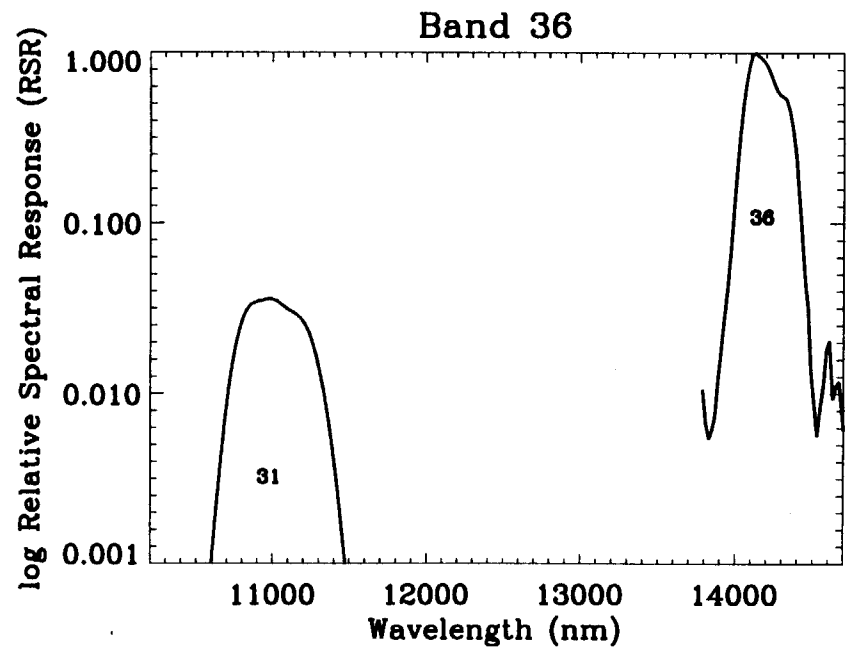
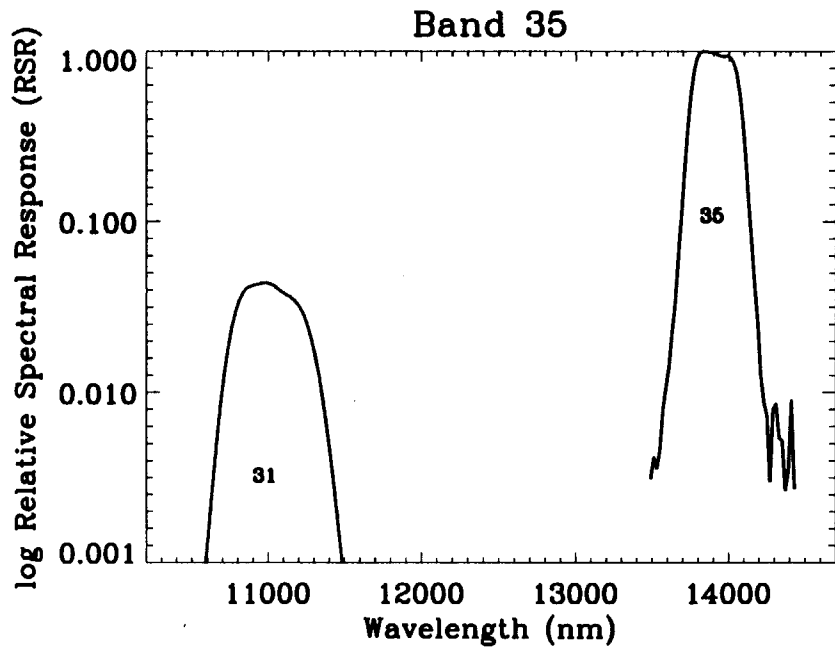
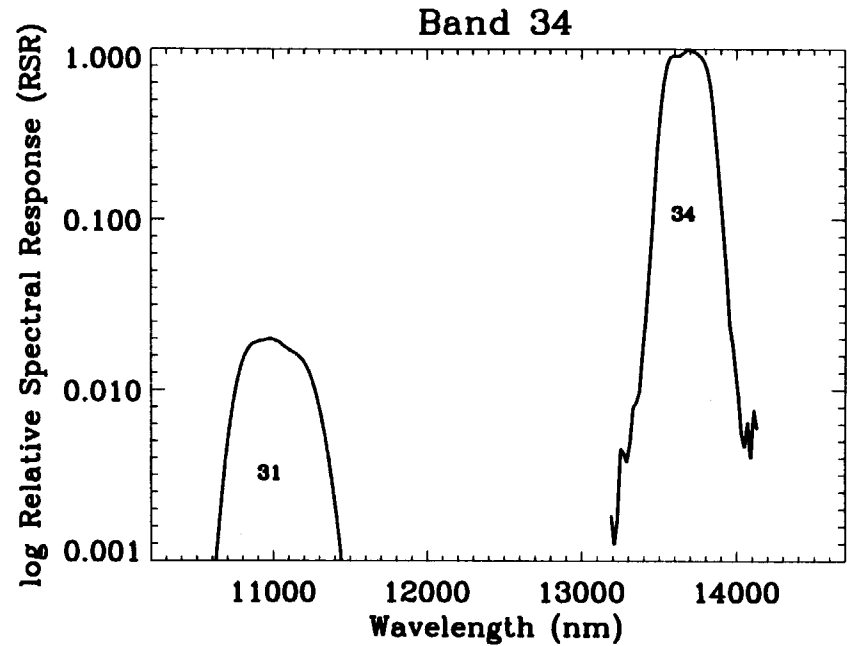
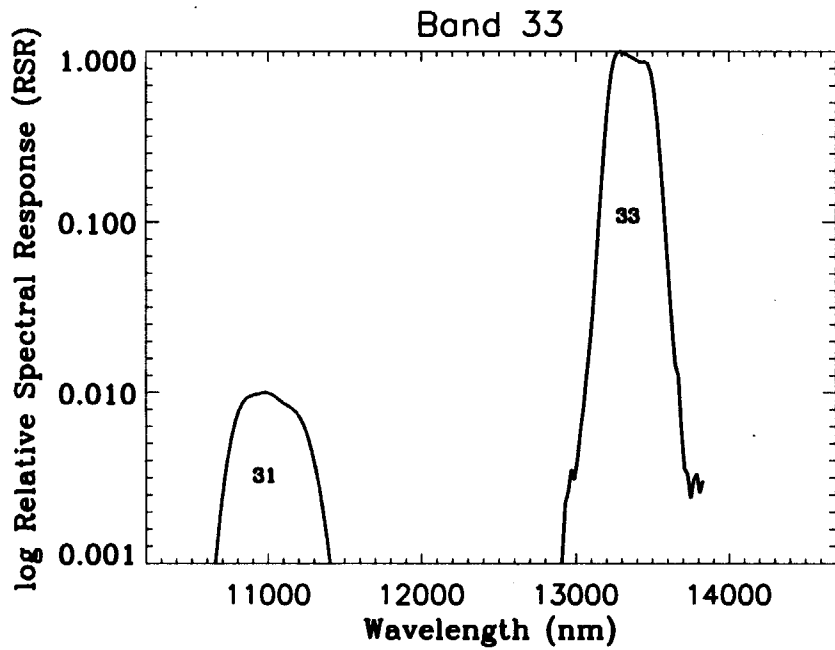
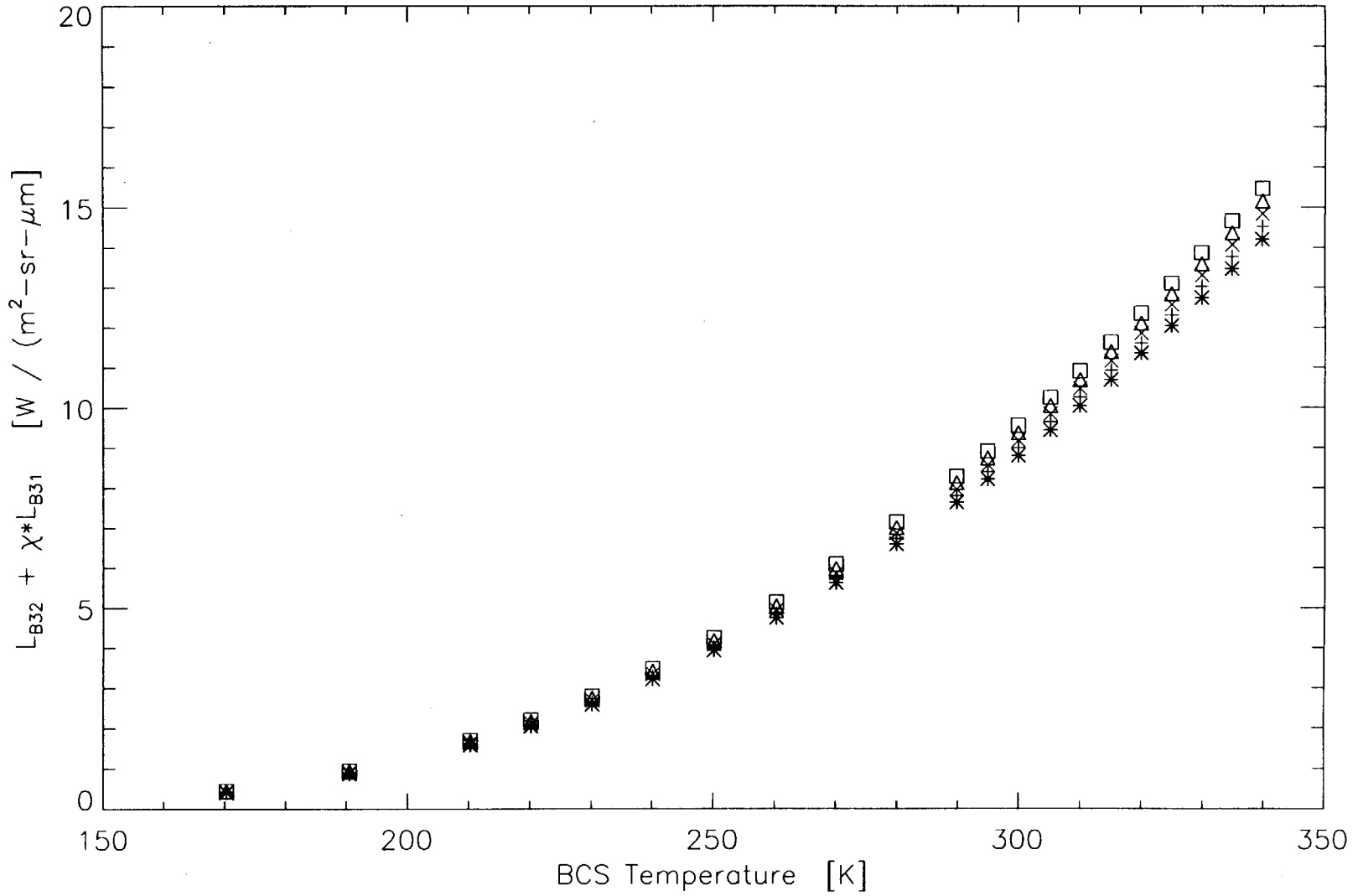


Figure 5. LWIR FPA ICD 404421 Sheet 2 Detail G with a schematic of the offending ray which may be the mechanism for the observed anomalous response. The energy passes through the band 31 filter into the band 33-36 PC detector substrate and strikes the PC detector (on the filter side of the substrate) from within. Note: The true raytrace follows the index of the materials and will cause a different effect than shown in the figure.

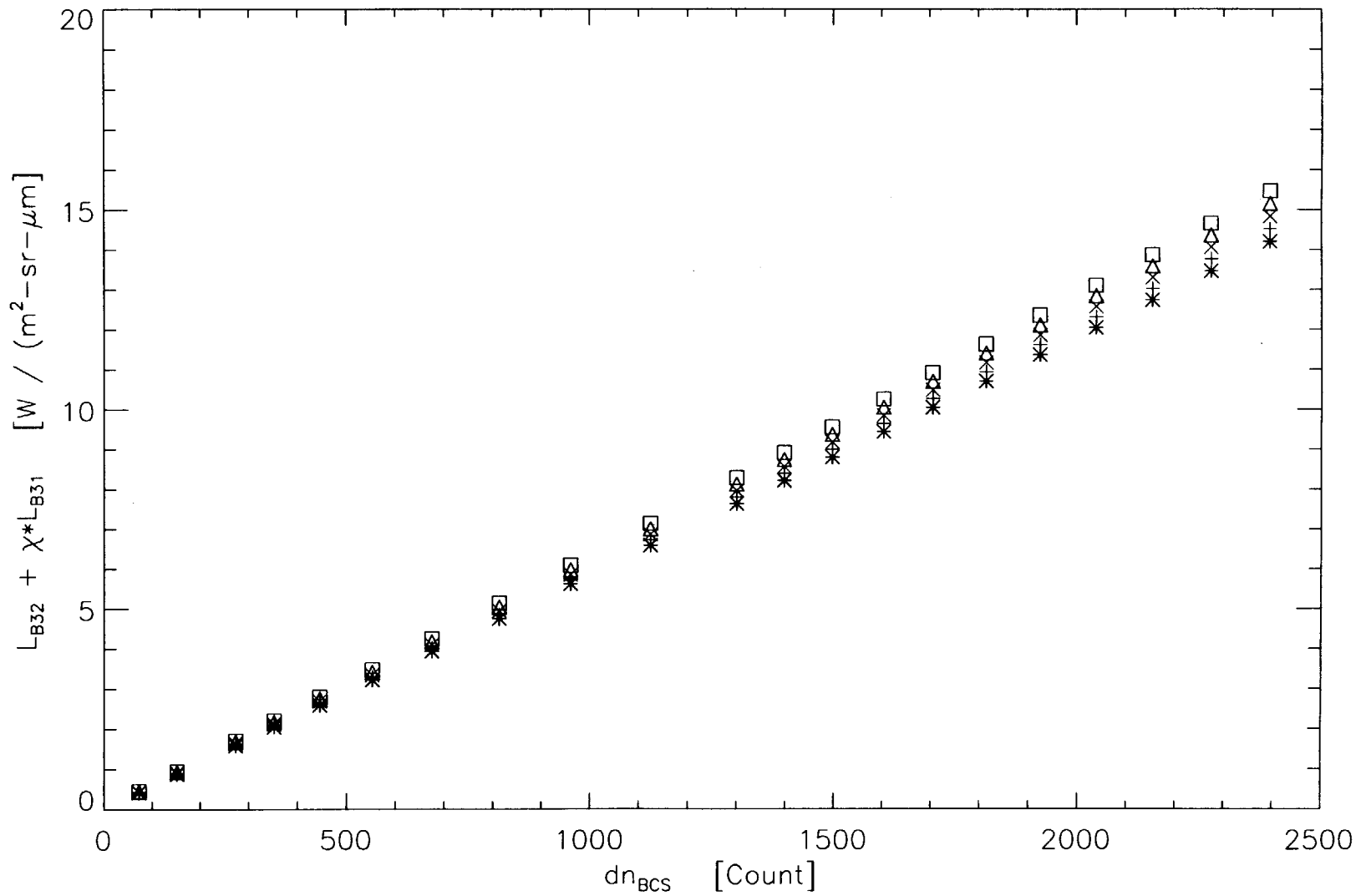
Notional LWIR PC Bands RSRs (B33@1.0%; B34@3.0%; B35@4.4%; B36@3.6%)
(These Preliminary crosstalk amplitudes may be factor of 2 high)



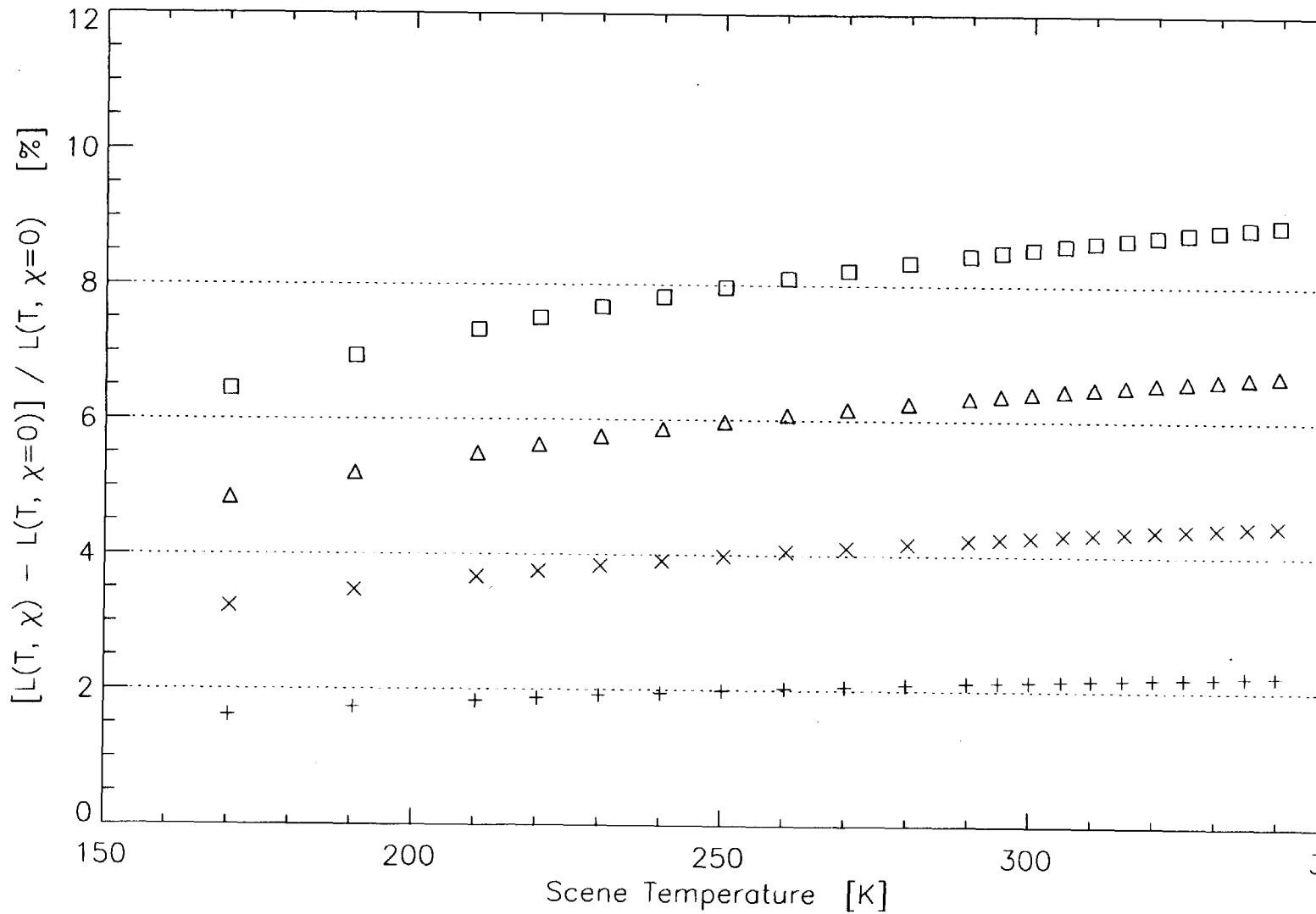
B32 Detected Radiance vs BCS Temperature as a Function of Crosstalk (χ)
Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



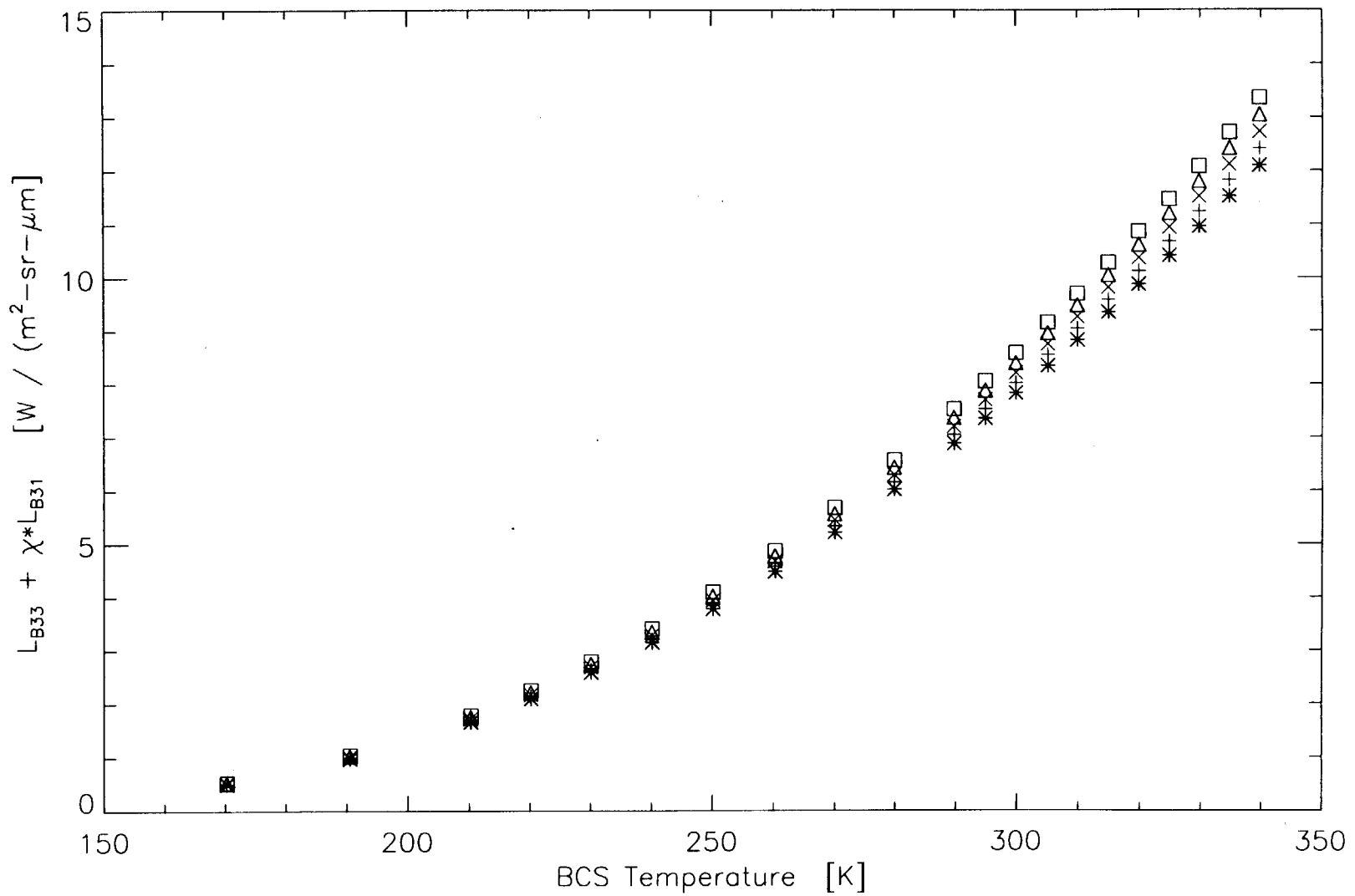
B32 Detected Radiance vs B32 dn_{BCS} ($DN_{BCS} - DN_{SVS}$) as a Function of Crosstalk (χ)
Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



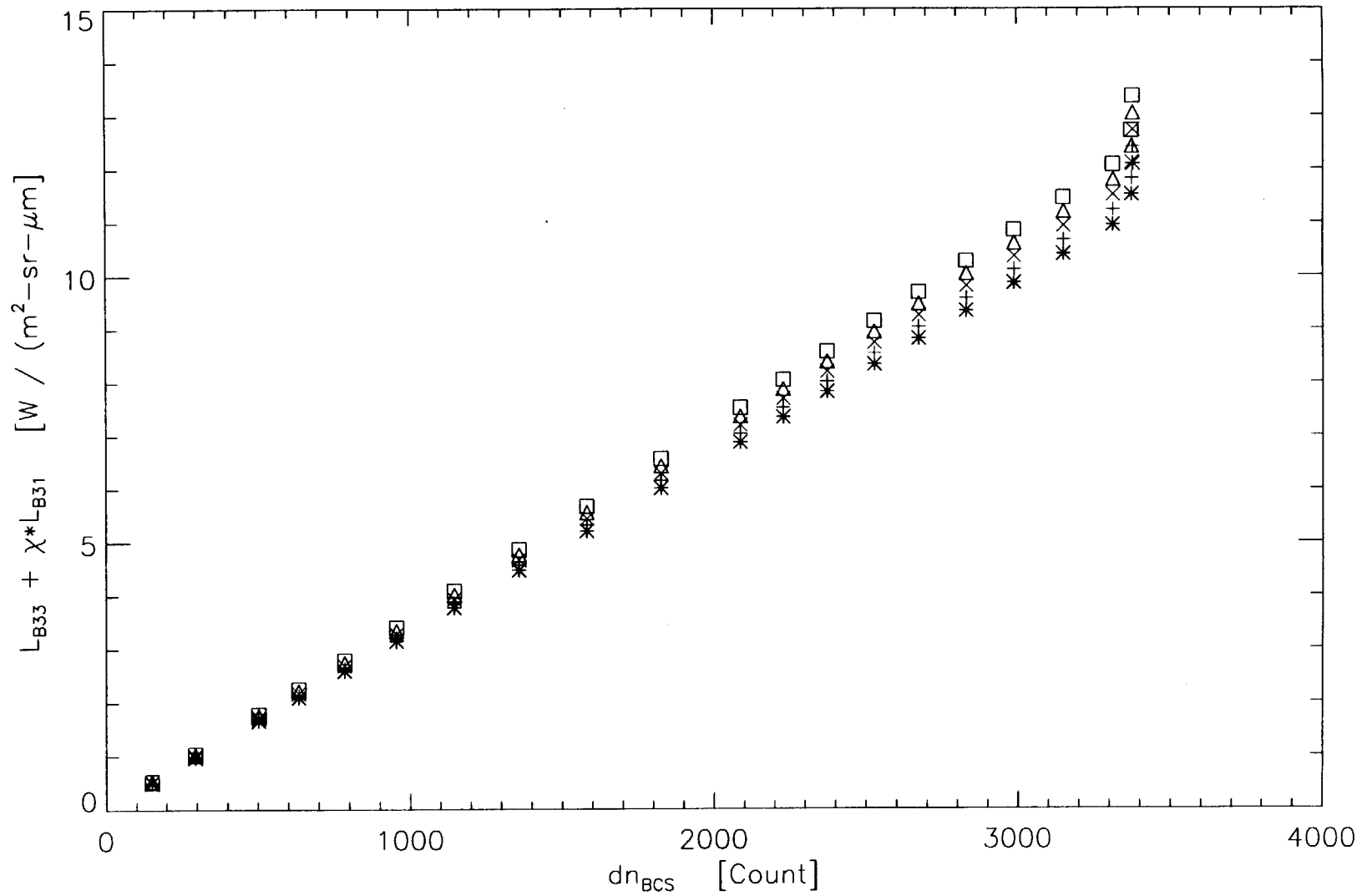
B32 Radiometric Error as a Function of Scene Temperature for χ [%] Crosstalk Input from B31 ($\chi = 2, 4, 6, 8\%$ Amplitude)



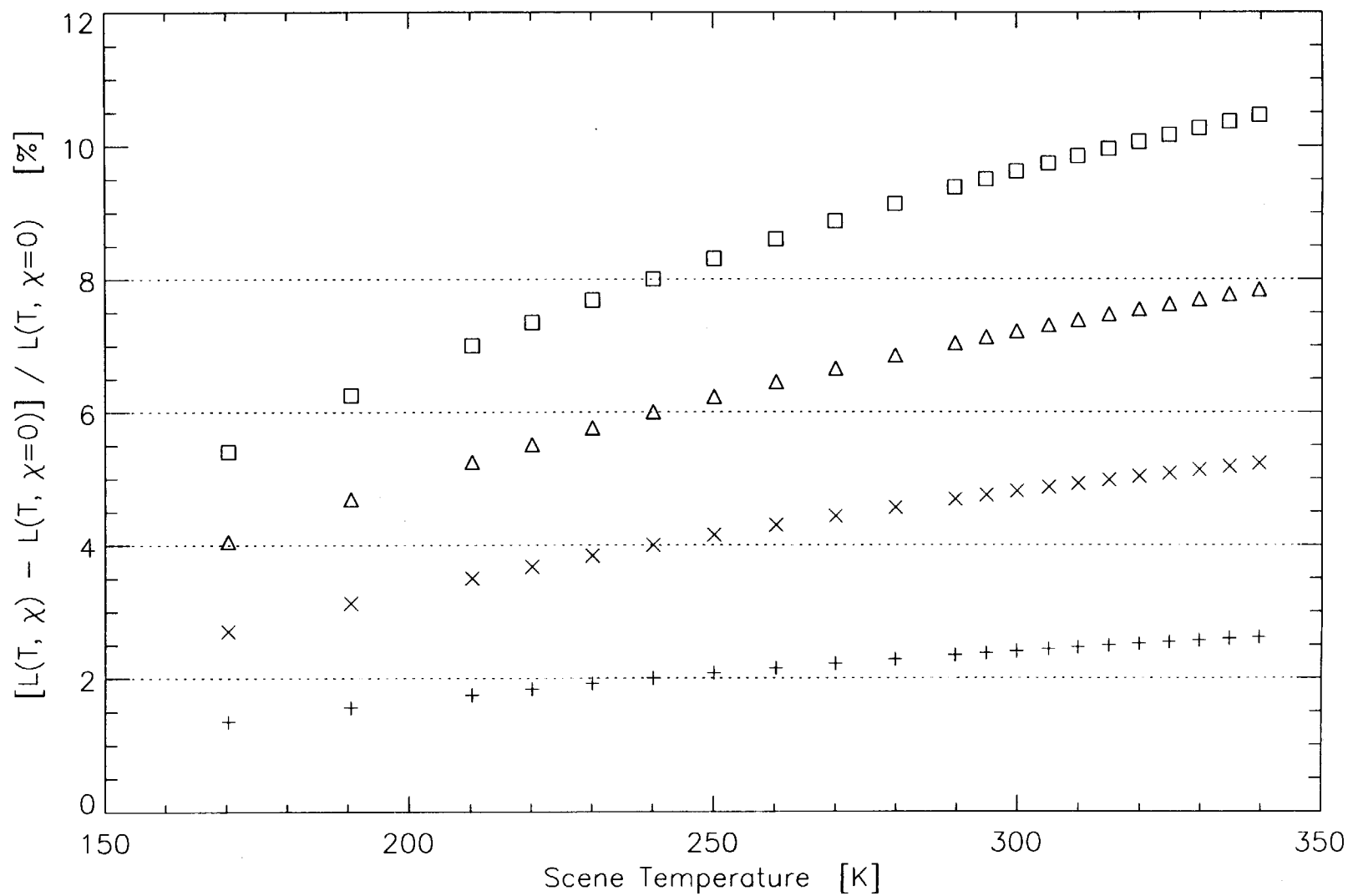
B33 Detected Radiance vs BCS Temperature as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



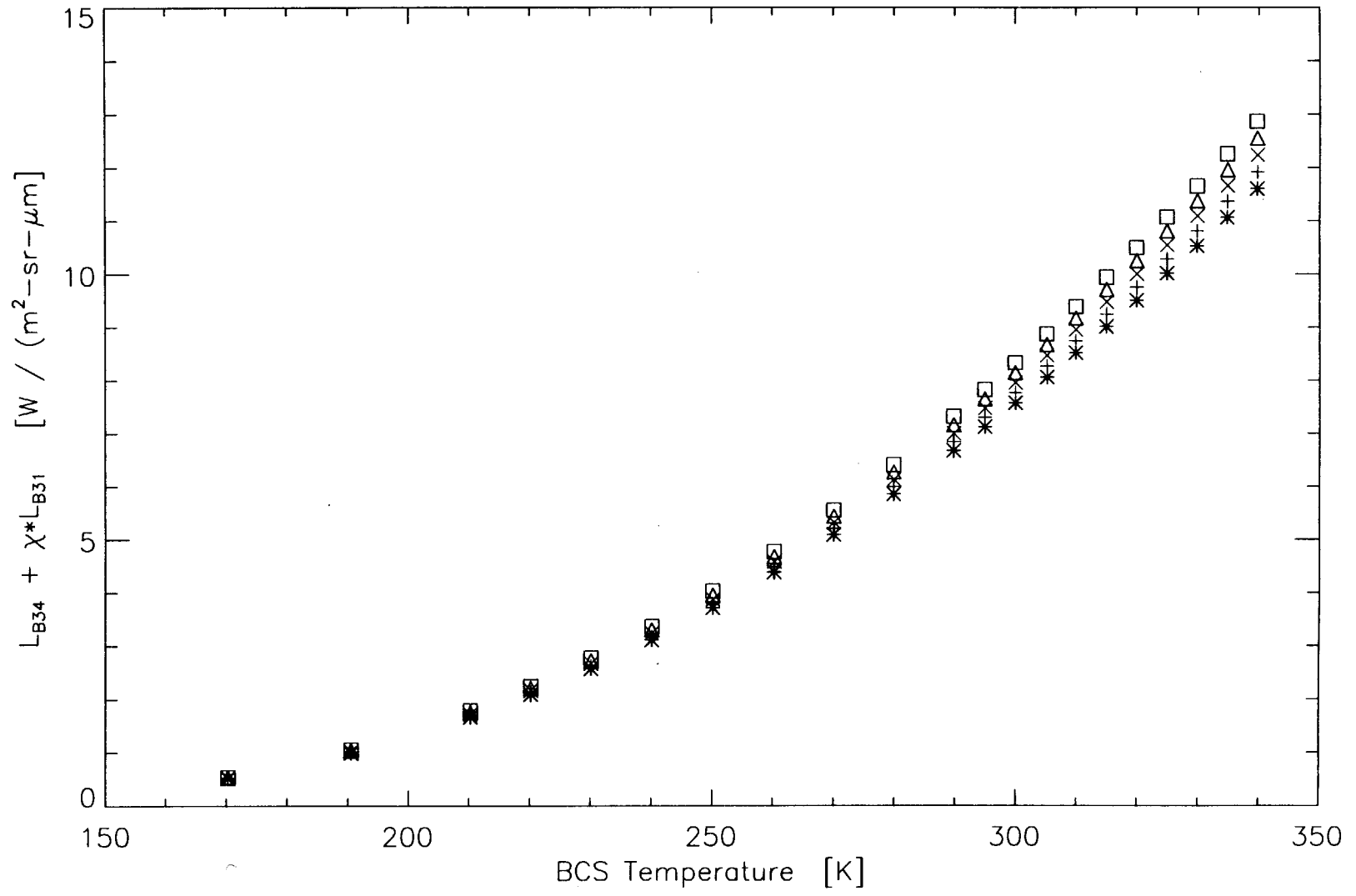
B33 Detected Radiance vs B33 dn_{BCS} ($DN_{BCS} - DN_{SVS}$) as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



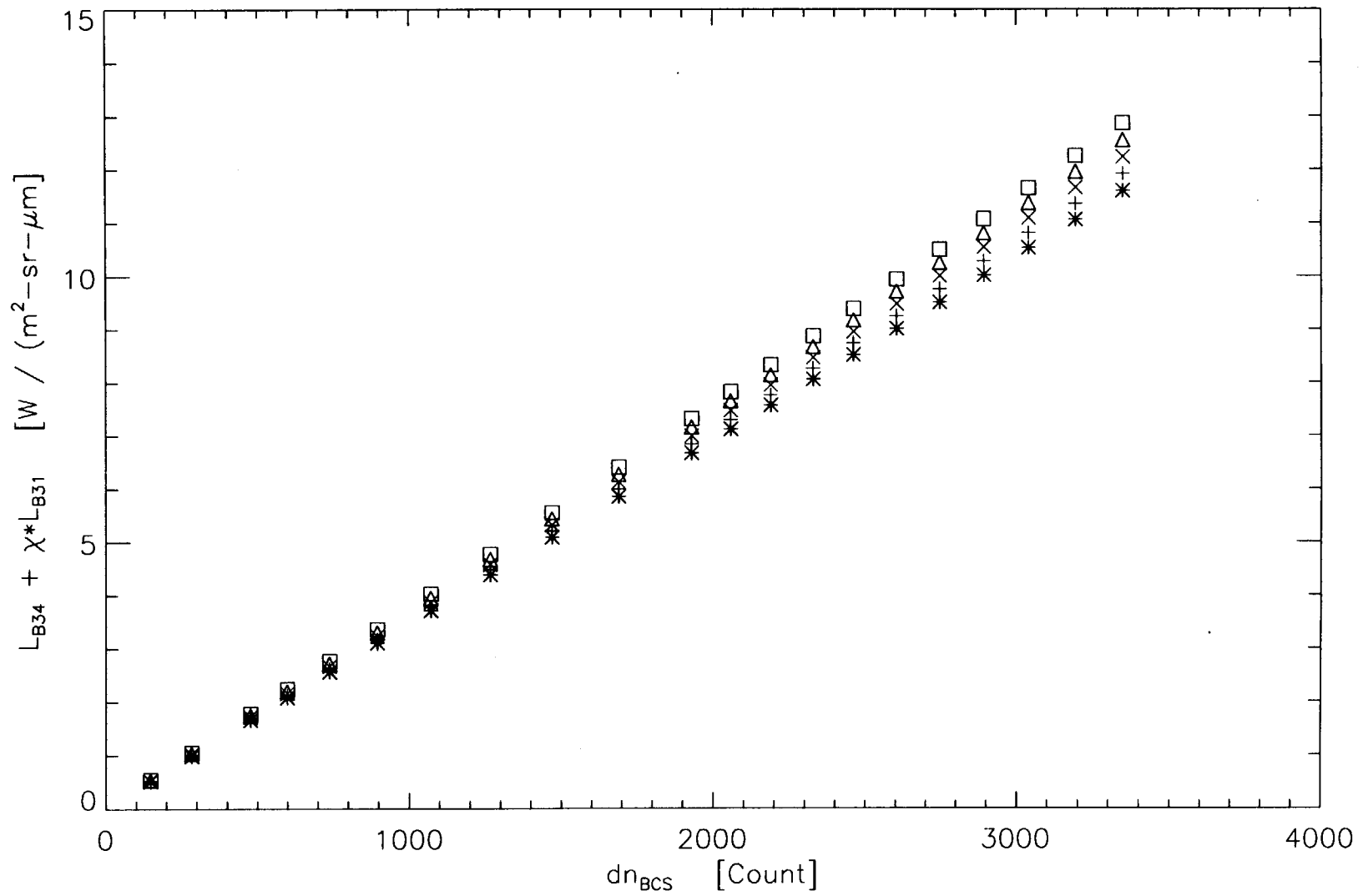
B33 Radiometric Error as a Function of Scene Temperature for χ [%] Crosstalk Input from B31 ($\chi = 2, 4, 6, 8\%$ Amplitude)



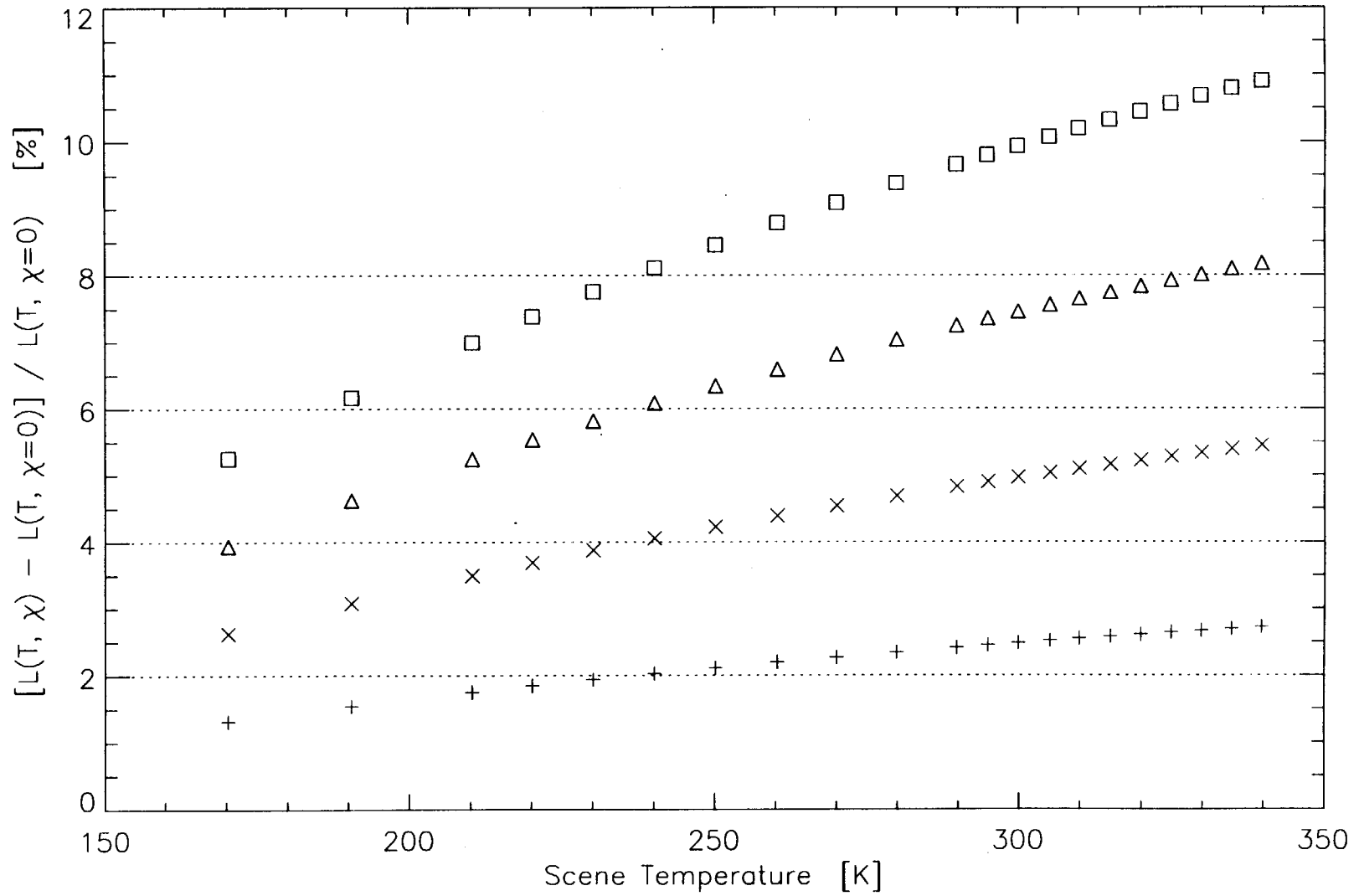
B34 Detected Radiance vs BCS Temperature as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



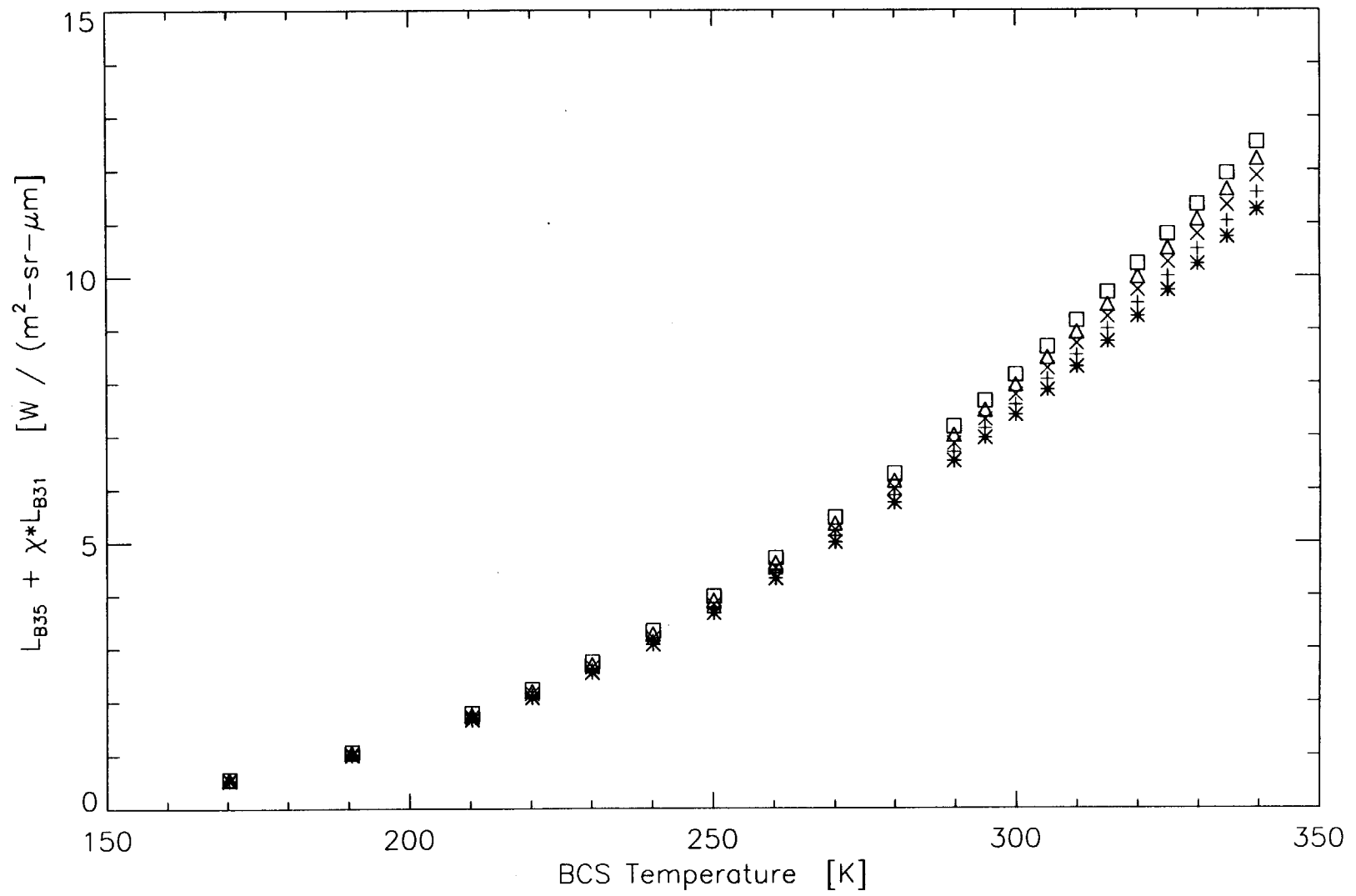
B34 Detected Radiance vs B34 dn_{BCS} ($DN_{BCS} - DN_{SVS}$) as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



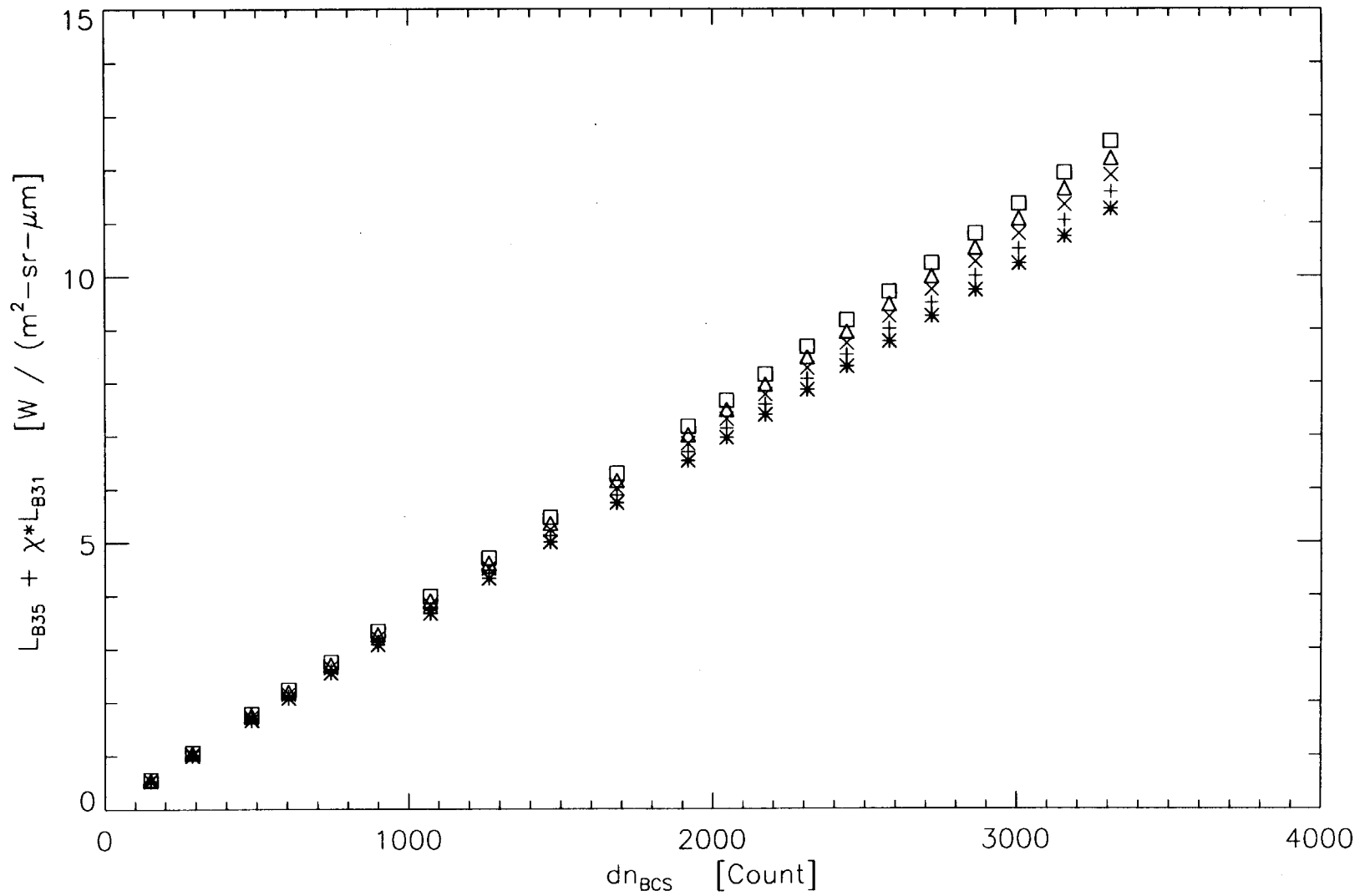
B34 Radiometric Error as a Function of Scene Temperature for χ [%] Crosstalk Input from B31 ($\chi = 2, 4, 6, 8\%$ Amplitude)



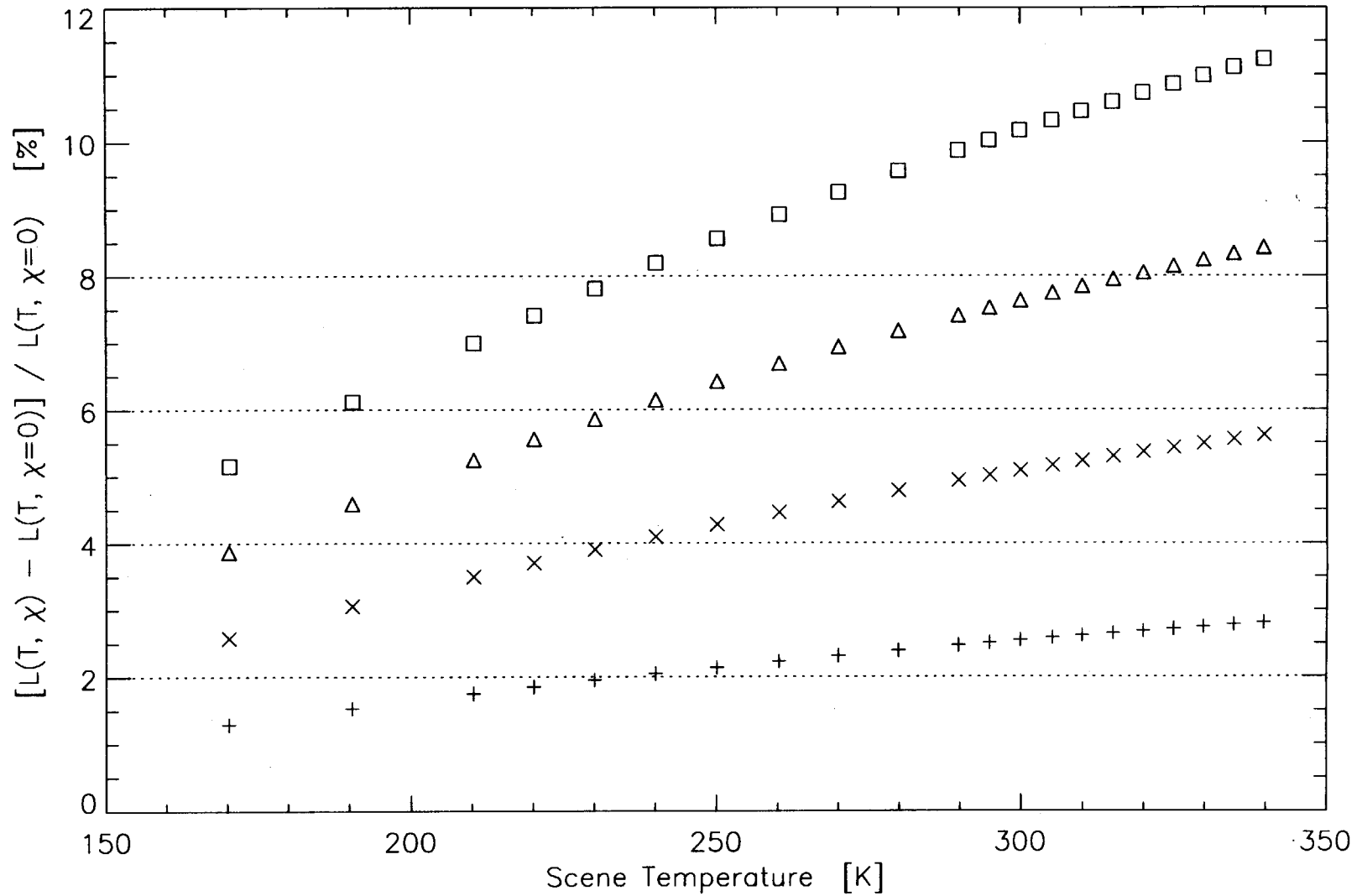
B35 Detected Radiance vs BCS Temperature as a Function of Crosstalk (χ)
Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



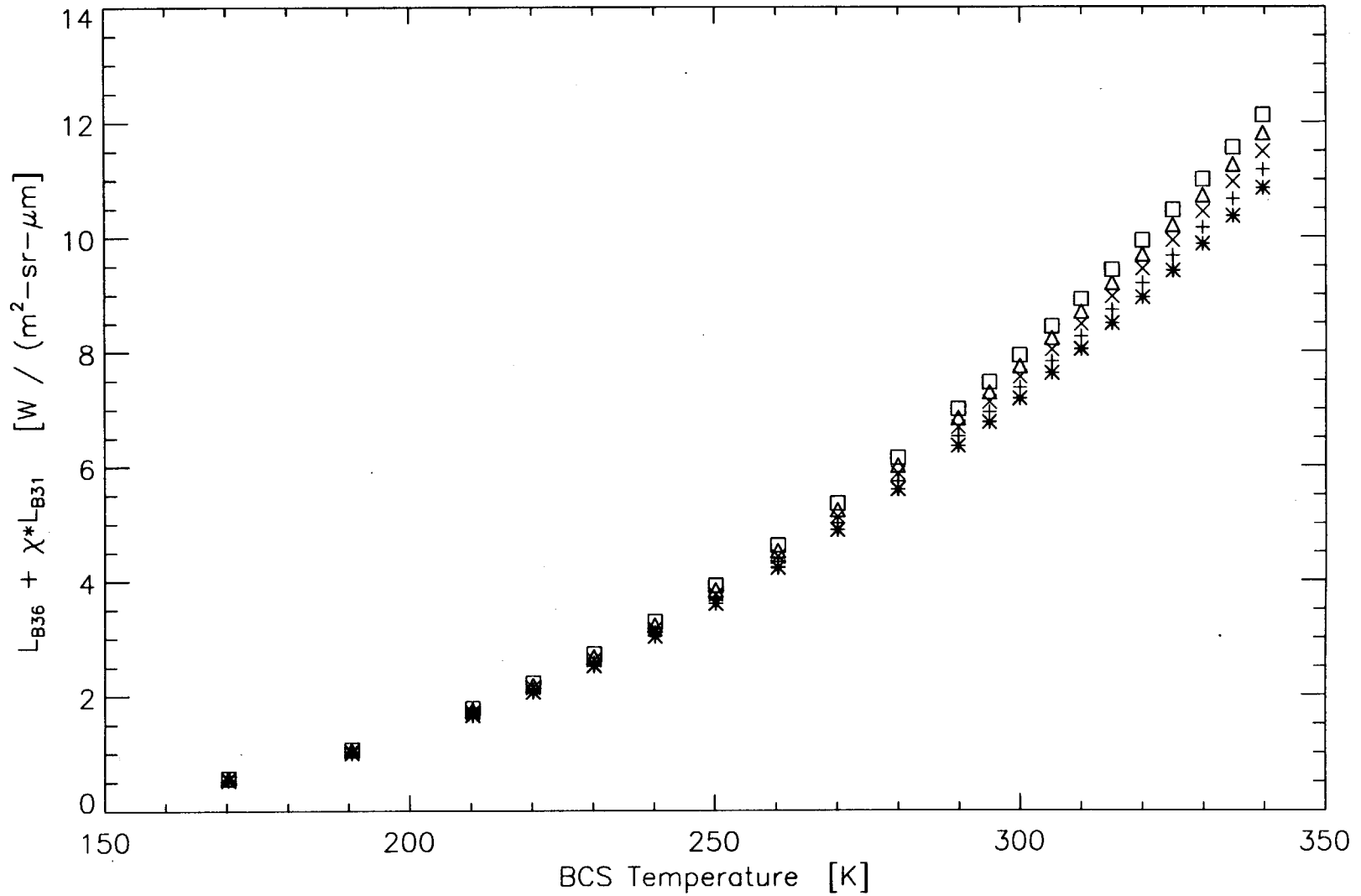
B35 Detected Radiance vs B35 dn_{BCS} ($DN_{BCS} - DN_{SVS}$) as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



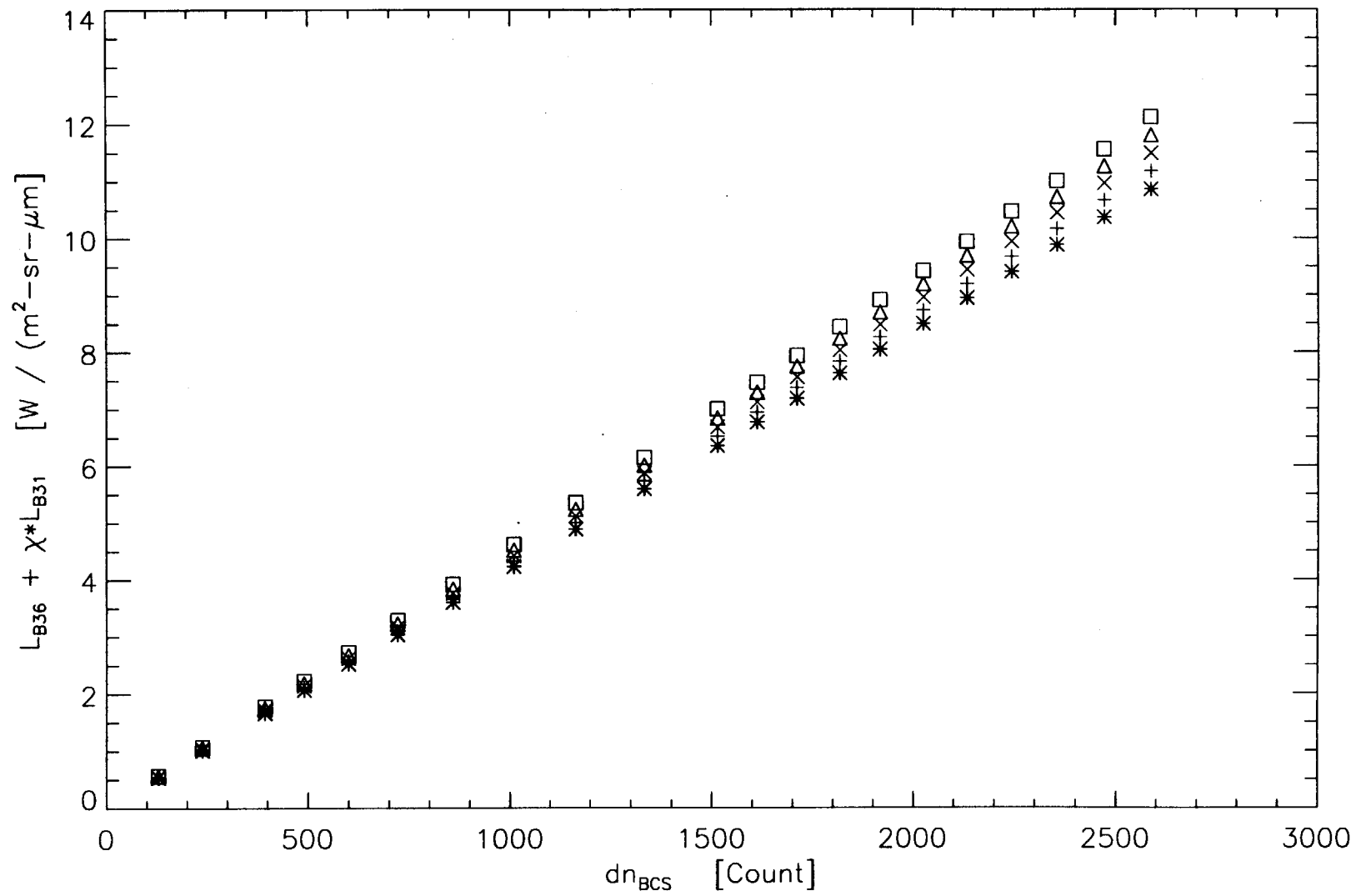
B35 Radiometric Error as a Function of Scene Temperature for χ [%] Crosstalk Input from B31 ($\chi = 2, 4, 6, 8\%$ Amplitude)



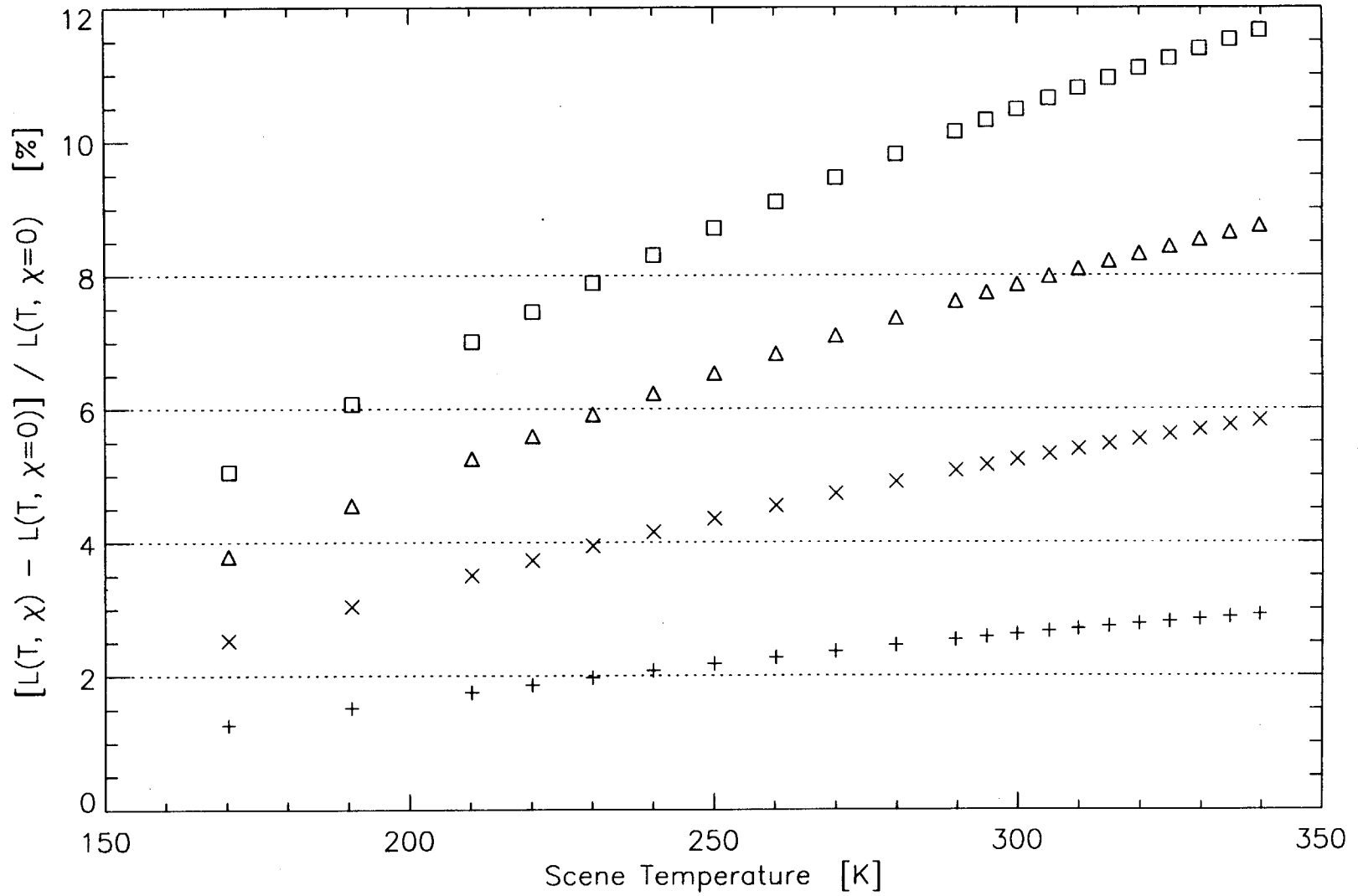
B36 Detected Radiance vs BCS Temperature as a Function of Crosstalk (χ)
Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



B36 Detected Radiance vs B36 dn_{BCS} ($DN_{BCS} - DN_{SVS}$) as a Function of Crosstalk (χ)
 Input from B31 ($\chi = 0, 2, 4, 6, 8\%$ Amplitude)



B36 Radiometric Error as a Function of Scene Temperature for χ [%] Crosstalk Input from B31 ($\chi = 2, 4, 6, 8\%$ Amplitude)



Crosstalk Correction in MODIS Level 1B Algorithm

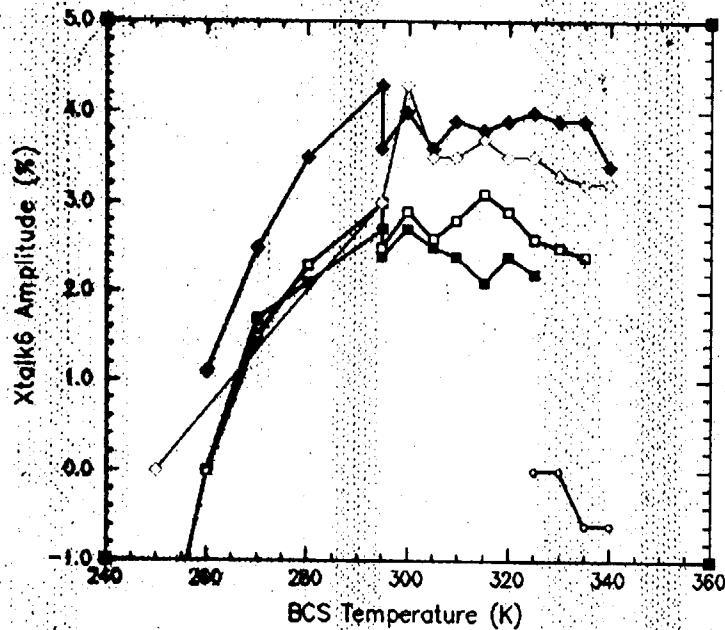
- Correct Responsivity (radiance per DN) and Earth Scene for Crosstalk
- Apply Spatial Offset based on IAC data
- Consider Single Pixel vs NxN Averaging
- Linear Form being investigated:

$$R'_{i,j} = R_{i,j} + R_{31,j} * xtalk_{31,j \rightarrow i,j} * \left(\frac{resp_{i,j}}{resp_{31,j}} \right)$$

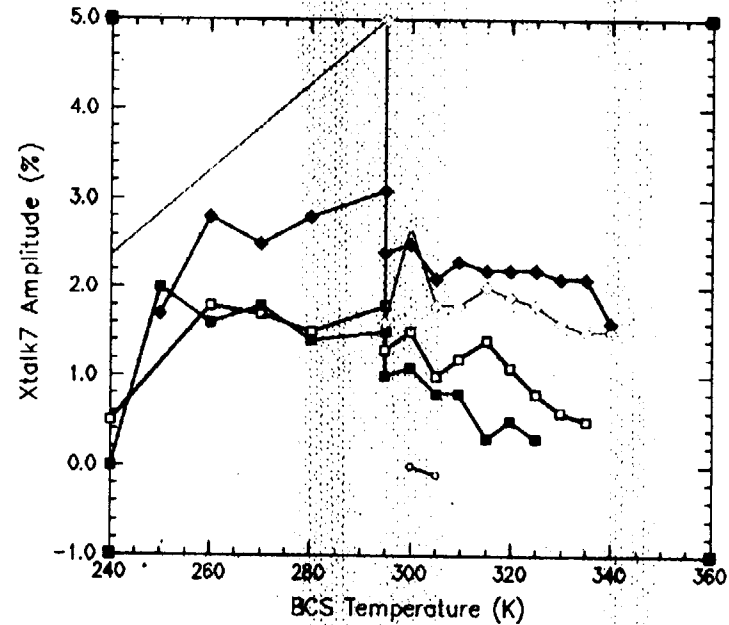
Crosstalk Amplitude Retrieval UAID1595 Series (RC-02)

Retrieval Sensitive to Small Changes in Physics

Zero Contribution from SVS



With Contribution from SVS



- Band 32; ch5
- Band 33
- Band 34
- ◆—◆ Band 35
- ◇—◇ Band 36

MODIS PC Band Crosstalk

- **Spatial, spectral components:**
characterized by IAC data collects
- **Amplitude:** Consistency sought between RC-02 data sets and IAC, NFR/PSR.
Sensitive to physics.
- **Goal:** characterize to within 1%
- **Investigating Linear correction algorithm**