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Erratum: A NICER viewing angle on the accretion stream of Vela X-1 (2023 ApJ 950 170)

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1. REFLECTION MODEL CORRECTION

A $\frac{1}{4\pi}$ factor was missing in the reflection model described in Appendix A, equation A5. The equation should read:

$$F = \frac{1}{4\pi} A_Z \omega_{K\alpha} \int_{E_{K,Z}}^{\infty} \int \frac{I_0 (\frac{E}{E_0})^{-\Gamma} \sigma_{Z,K}(E)}{\sigma(E) + C(\theta,\phi)\sigma(E_{K\alpha,Z})} d\Omega dE \tag{1}$$

When this correction is applied to the model appearing in Figure 7, the over-prediction of the Fe-Kα flux vanishes and is replaced by a persistent under-prediction at all phases. A corrected version of Figure 7 is given below (Figure 1). This corrected result is consistent with previous results by Watanabe et al. (2006). This correction does not invalidate the paper's conclusions regarding additional reflection from the accretion stream. Rather, it is now apparent that the companion alone cannot account for the emission in any phase. This reinforces the role of the accretion stream as the most likely candidate for the observed emission lines. The exact contribution from the stream likely depends on how much of the stream is visible at each phase. We expect higher contributions around phases 0.35 and 0.65. In Figure 1 the highest accretion stream contribution is between 0.3-0.4 and around 0.7. Short observations of other fluorescence lines are required to study the geometry of the accretion stream further.

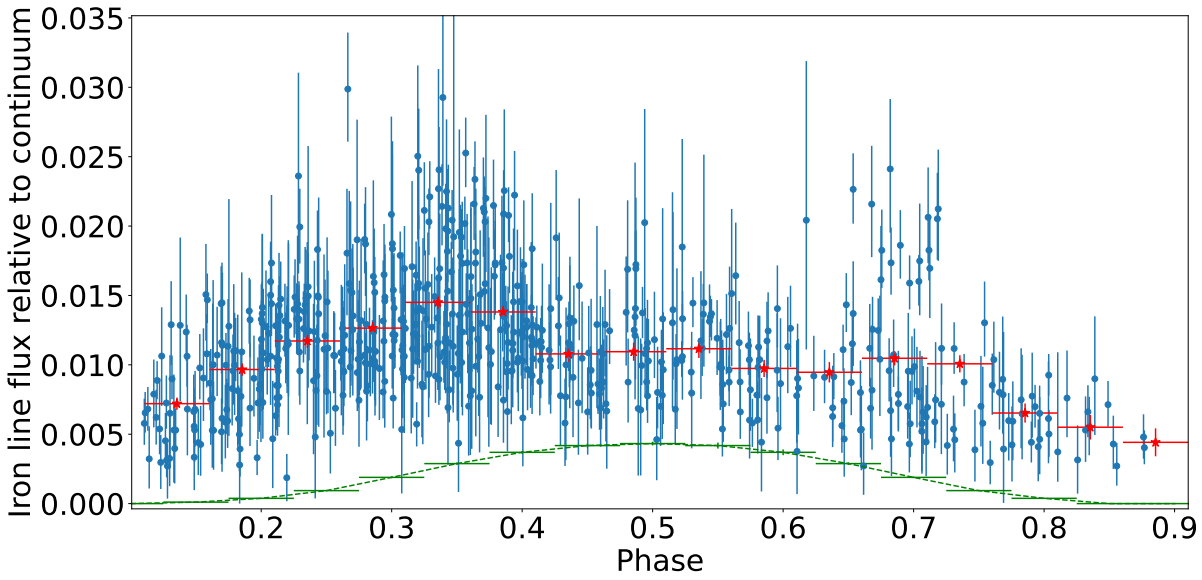

Figure 1. Relative Fe Kα line flux with phase (blue, and 0.05 phase averaged in red), compared to the expected reflection from the surface of a sphere (green) relative to the continuum. The model under-predicts the measurements, sometimes severely. Reflection from a sphere alone cannot explain the observed line flux.

REFERENCES

16 Watanabe, S., Sako, M., Ishida, M., et al. 2006, The
17 Astrophysical Journal, 651, 421