

Appendix C MOSFiT Best-fit Parameters

Figure C1 shows the two-dimensional MOSFiT posterior parameters distributions. The model fit can be seen to be well converged.

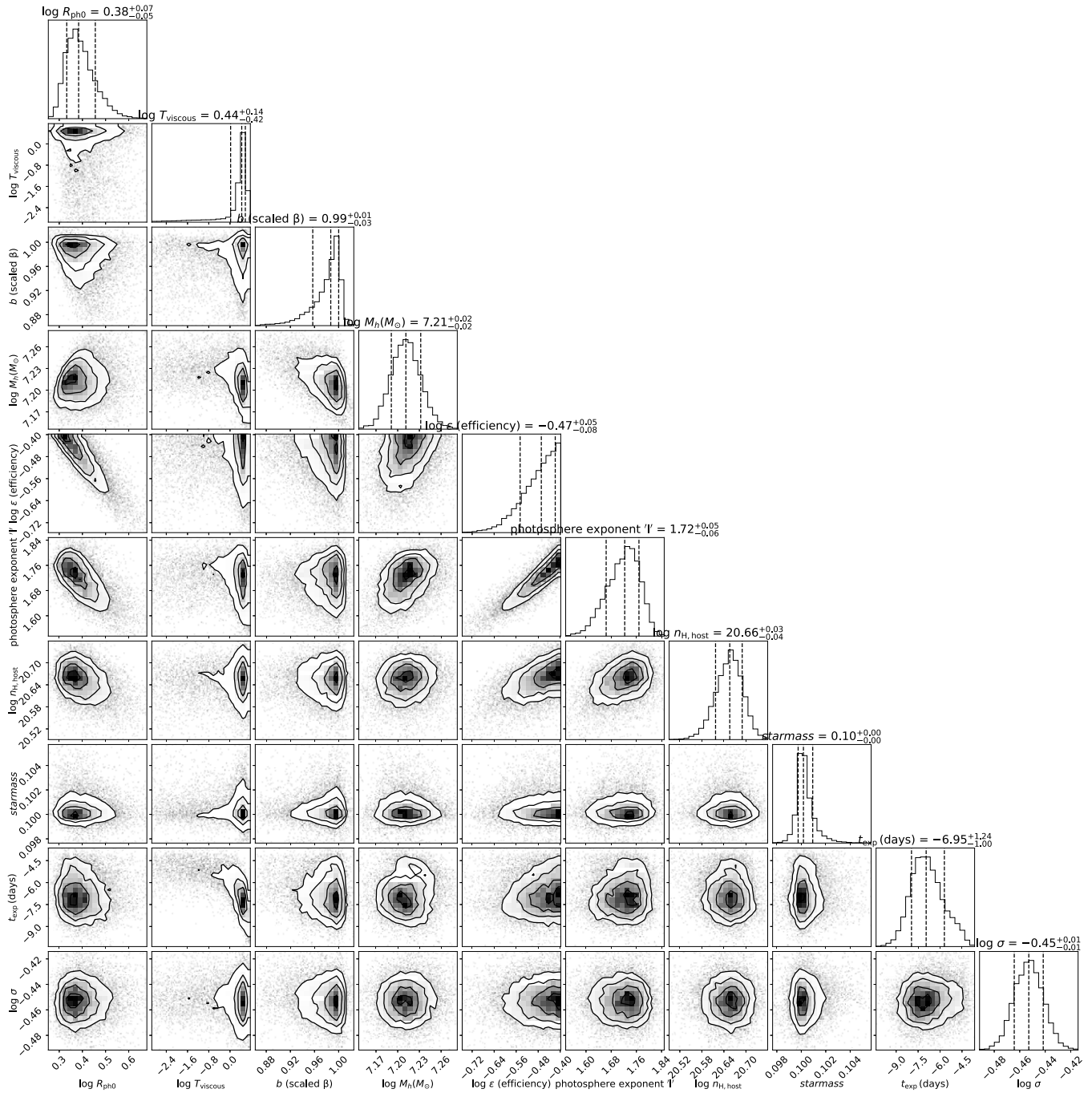


Figure C1. Corner plot showing the posterior parameter distributions for the MOSFiT model fit. 1σ confidence intervals are marked.

Appendix D

TDEMass Parameters

Figure D1 shows the inferred SMBH and star masses from TDEMass, based on the peak bolometric luminosity and the blackbody temperature at the peak from SuperBol.

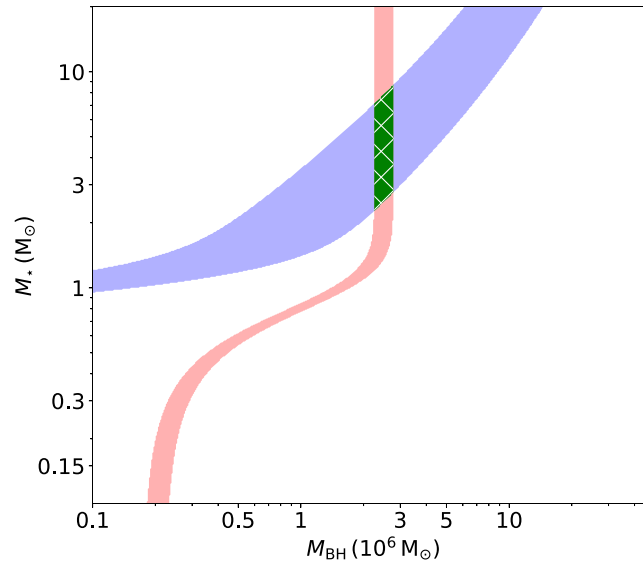


Figure D1. Inferred BH and star masses from TDEMass, with the blue shaded region indicating the range of solutions for the peak bolometric luminosity, and the red shaded region indicating the range of solutions for the blackbody temperature at this peak. The green region indicates the overlapping solutions.

Appendix E Spectral Data Processing

Figure E1 displays the step-by-step data-processing procedure applied on a spectrum obtained 13 days after the light-curve peak, as outlined in Section 3. The same procedure is applied to all spectra of AT 2019azh, apart from the du Pont and the WHT spectra for the reasons detailed in Section 3.

Figure E2 shows the spectroscopic evolution of AT 2019azh, after photometric calibration, host subtraction, and continuum removal, as described in Section 3.

Figure E3 shows the Gaussian fits of the $H\alpha$ line performed on the host galaxy and continuum-subtracted spectra. Masking the feature around 6100–6200 Å does not significantly alter the fits, indicating that they are not strongly affected by this feature. In the –32 days spectrum, removing the data blueward of 6200 Å also does not significantly alter the fit, indicating that it is not strongly affected by the emission seen there.

Figure E4 shows the relation between the offset of the $H\alpha$ line and its FWHM for AT 2019azh. The plot reveals a strong anticorrelation between these two properties.

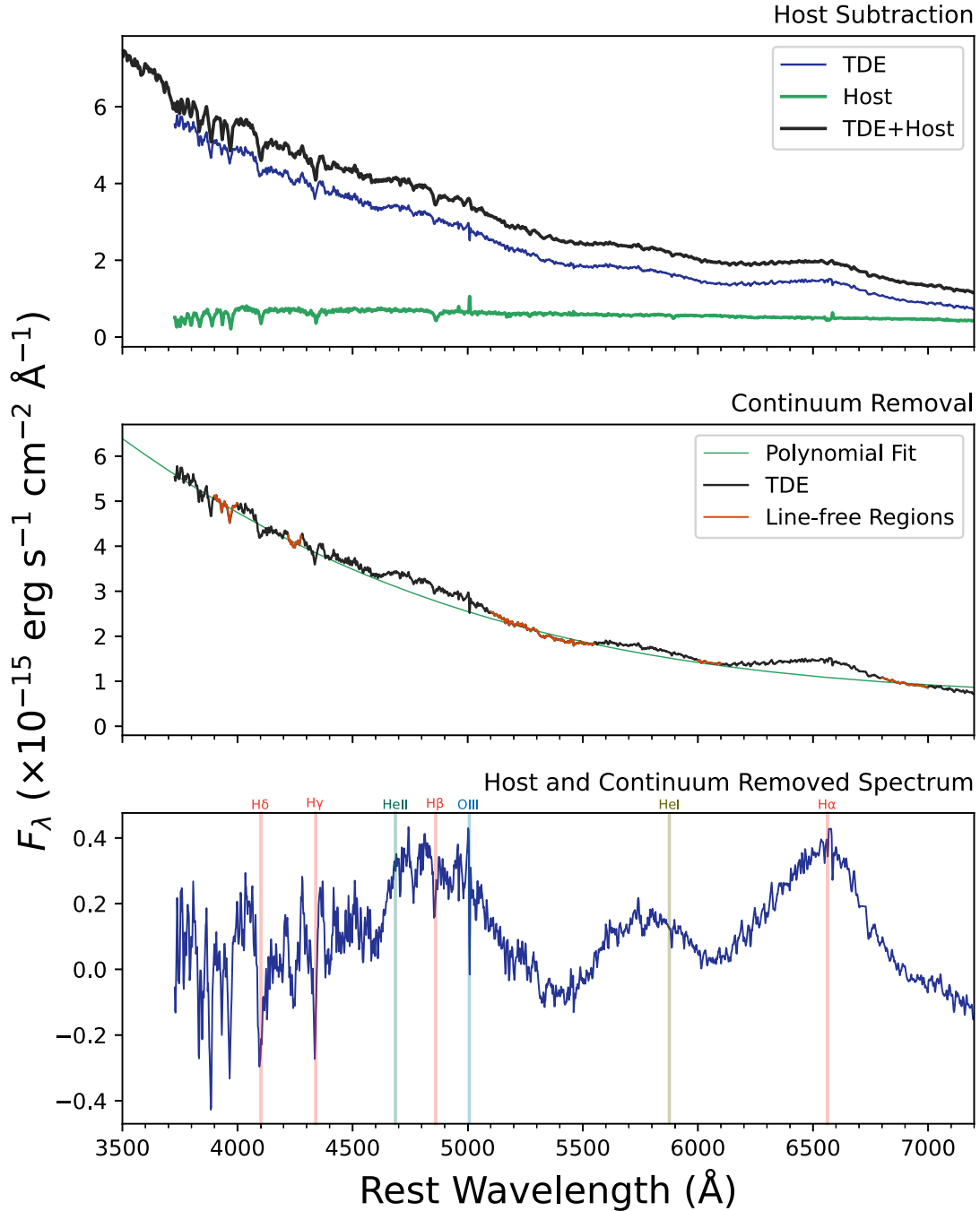


Figure E1. Top: archival resampled SDSS host galaxy spectrum (green), the photometrically calibrated spectrum of AT 2019azh, 13 days after light-curve peak (black), and the host-subtracted TDE spectrum (blue). Middle: host-subtracted spectrum (black) with selected line-free regions (red) used for polynomial fitting (green). Bottom: host and continuum-subtracted spectrum, showing broad $H\alpha$, He II $\lambda 4686$, and He I $\lambda 5876$ emission lines. The narrow [O III] $\lambda 5007$ and Balmer lines are likely oversubtracted host galaxy lines.

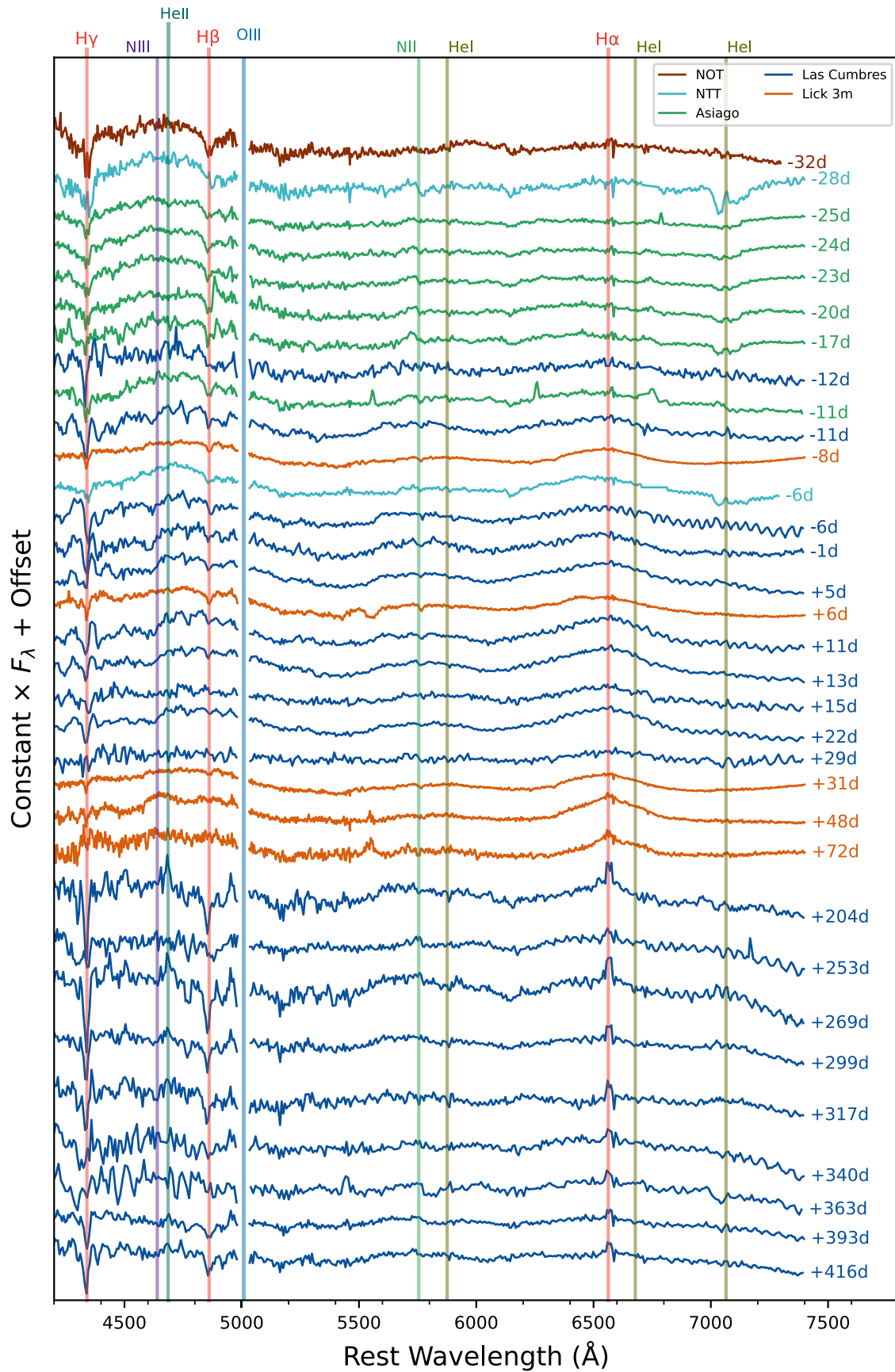


Figure E2. Spectroscopic evolution of AT 2019azh after host galaxy and continuum removal. [O III] λ 5007 lines are masked for display purposes. The phase of each spectrum relative to the *g*-band light-curve peak is indicated beside it.

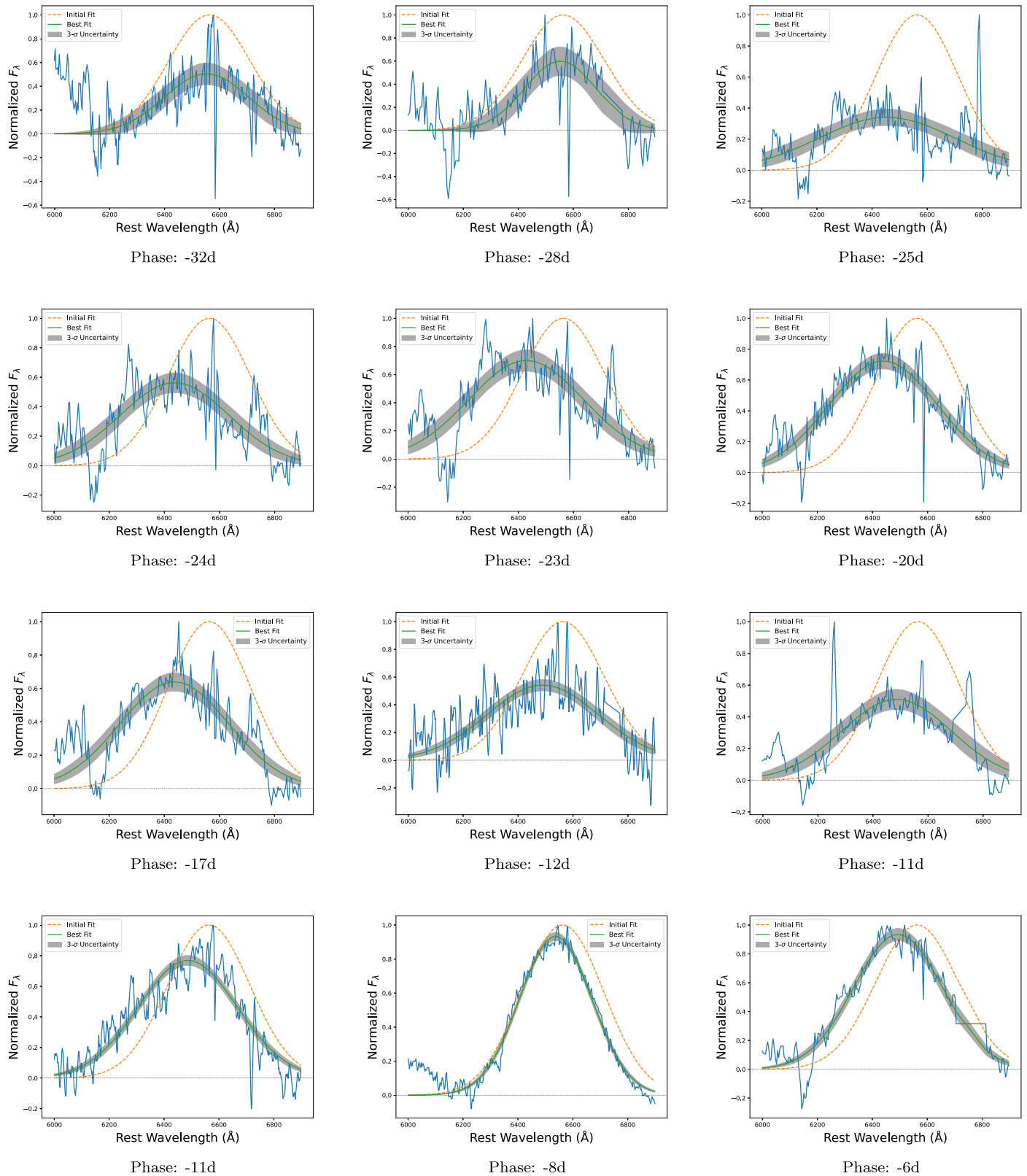


Figure E3. Best-fit results from fitting the H α line with a Gaussian are shown with solid green lines and the 3σ errors are represented in gray. In each case, the dashed line indicates the initial guess for the fit. Phases are noted in rest-frame days relative to the g -band light-curve peak.

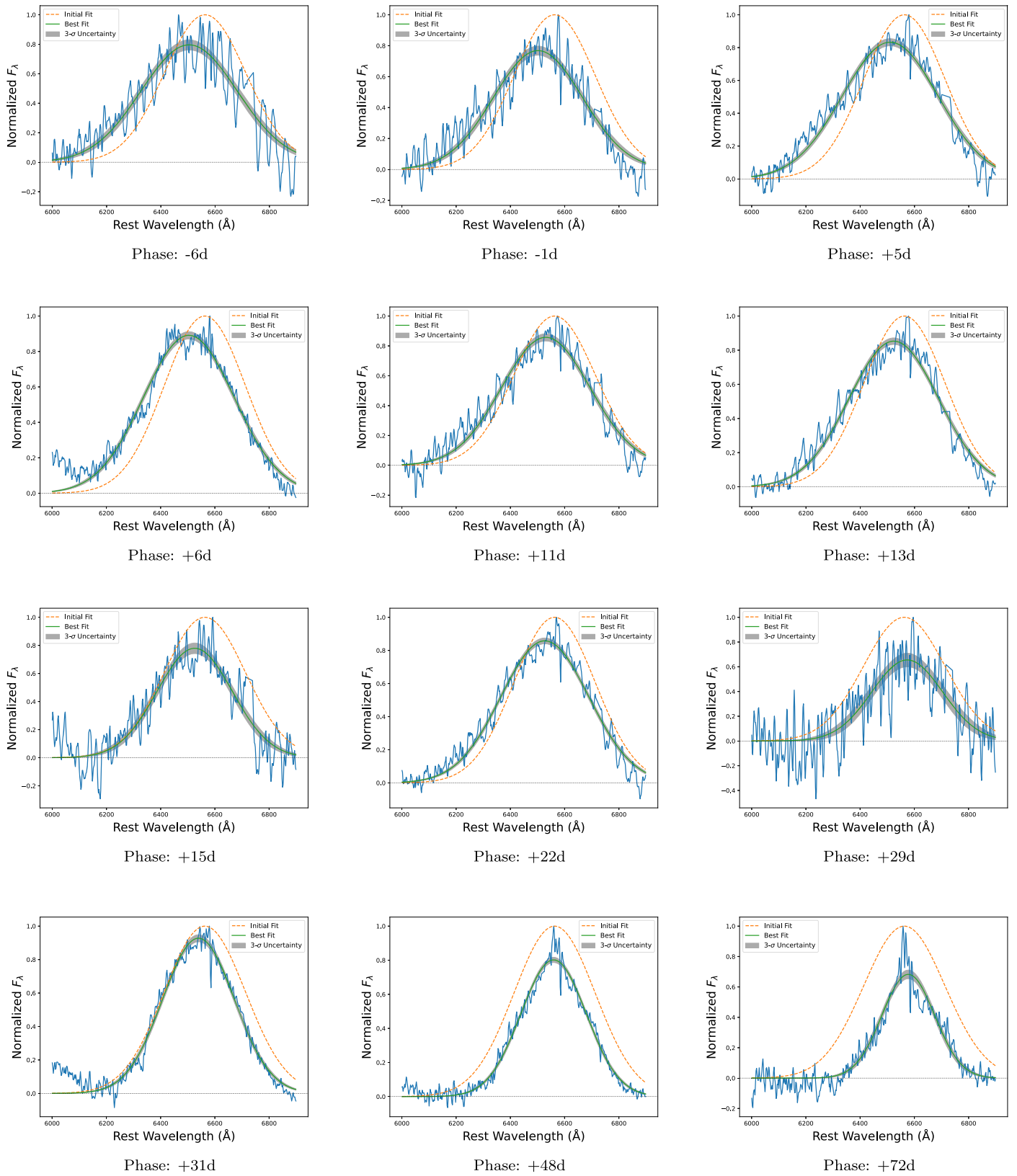


Figure E3. (Continued.)

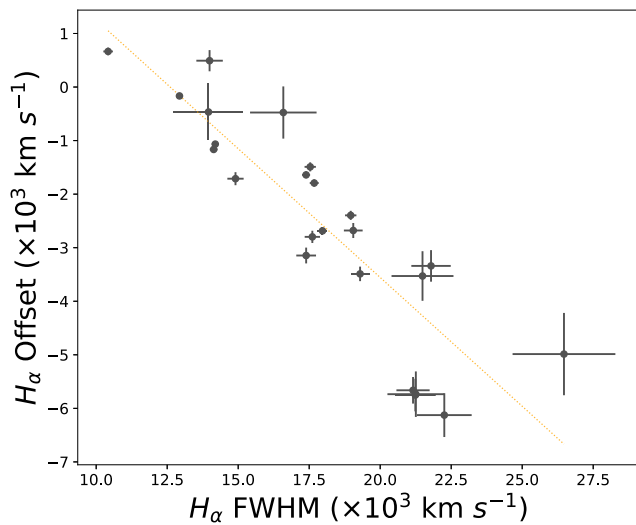


Figure E4. The anticorrelation between the $H\alpha$ offset and FWHM in AT 2019azh, with a Pearson coefficient of -0.876 . A linear fit is shown in the dashed orange line, having a slope of -0.481 .

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