New constraint on cosmological variation of the proton-to-electron mass ratio from Q0528−250

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APPENDIX A: VOIGT PROFILE FITS

Online only: Figures A1 through A14 show our Voigt profile model for the $z = 2.811$ absorber toward Q0528−250 and the surrounding Lyman-α forest regions, indicating both the positions of the H_2/HD components as well as the H I components used to fit the surrounding Lyman-α forest.
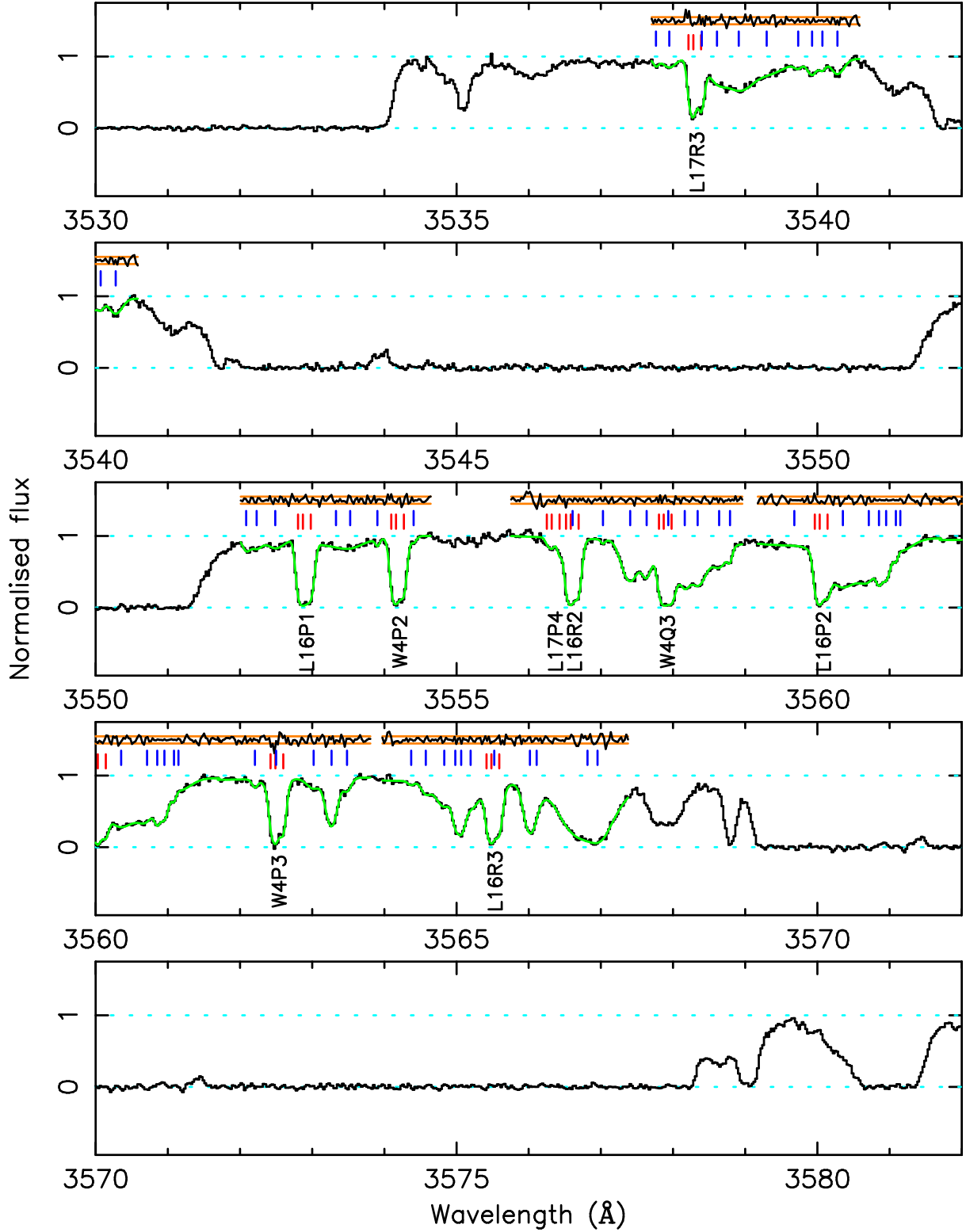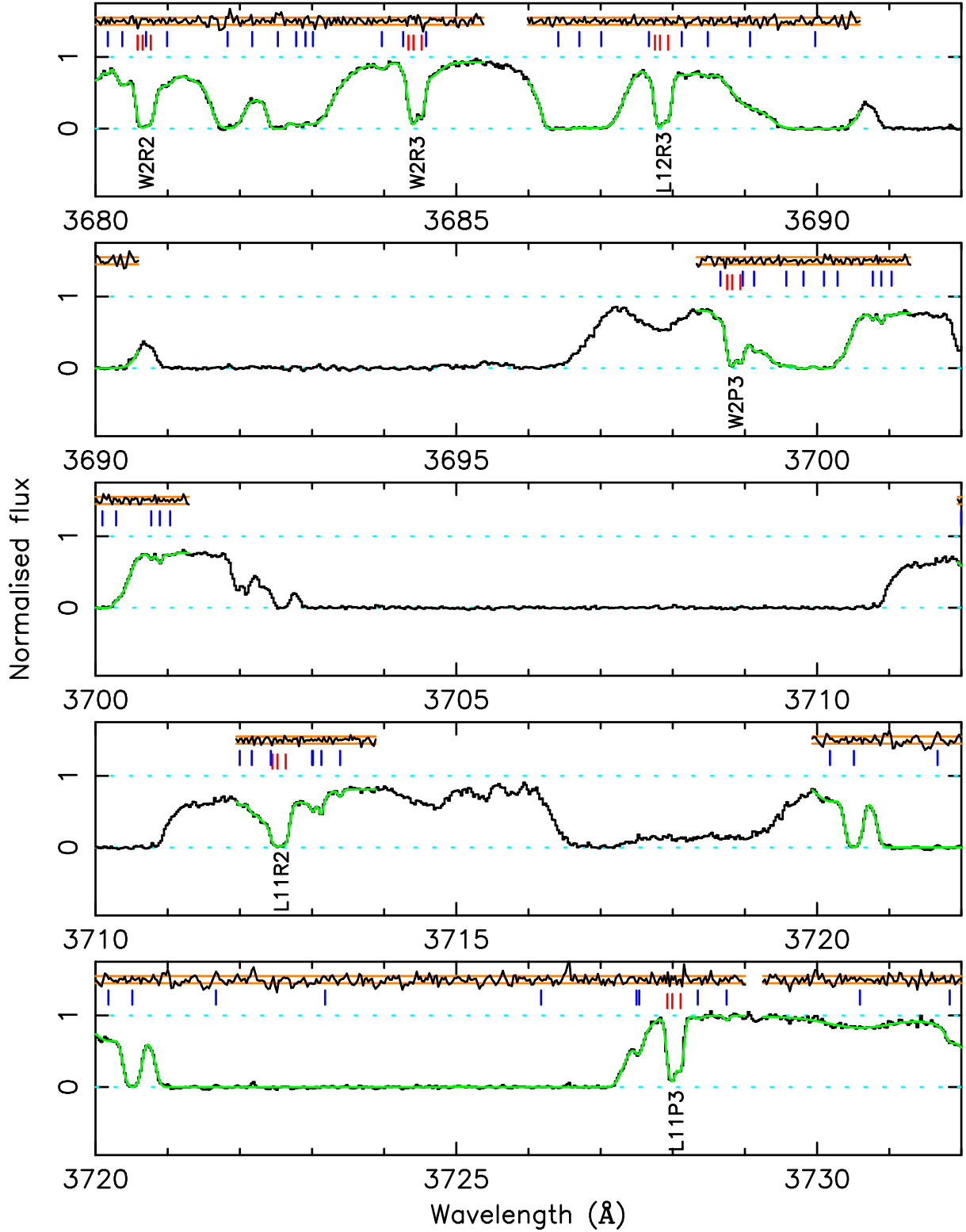
Figure A1. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 1). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.
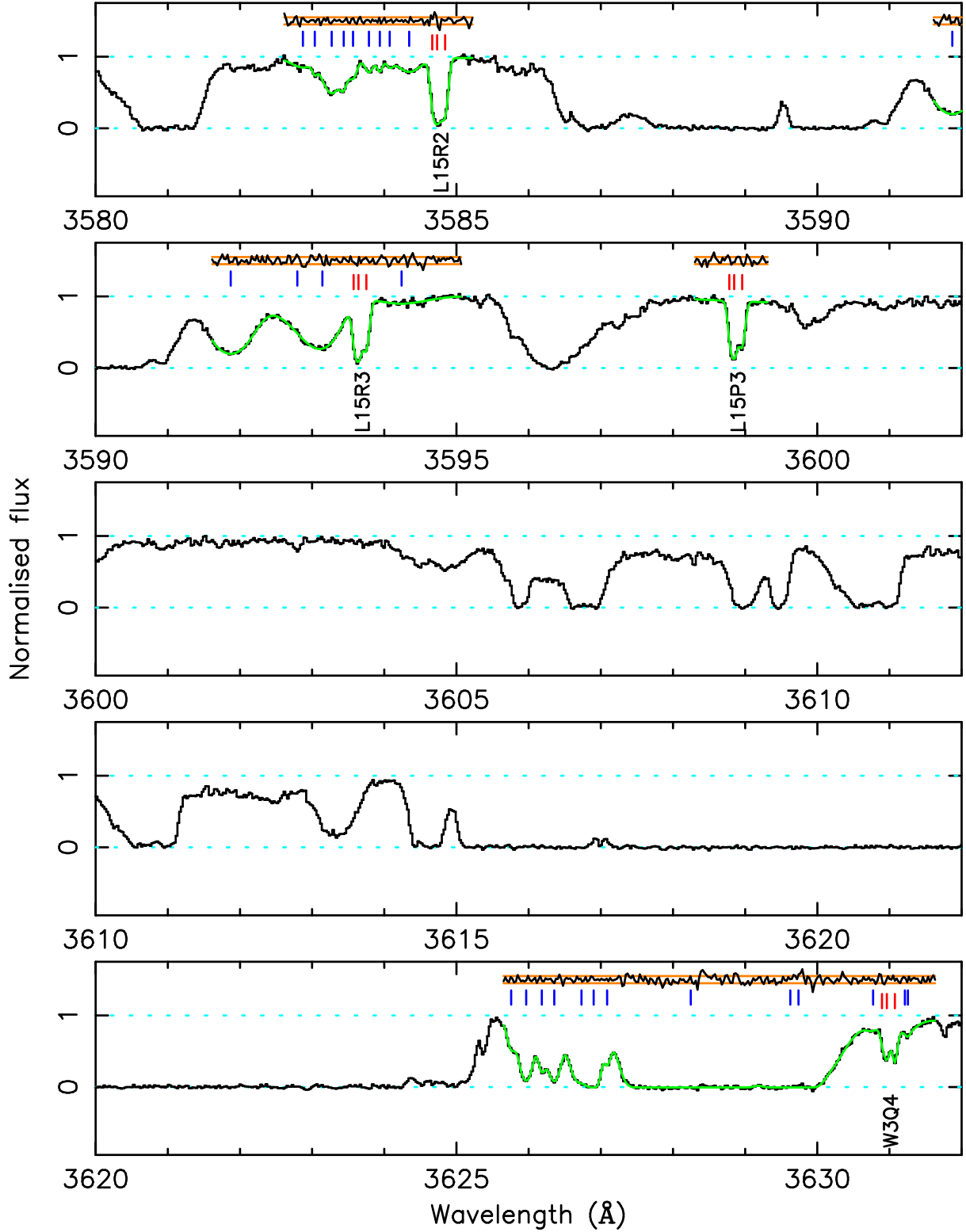
Figure A2. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 2). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.
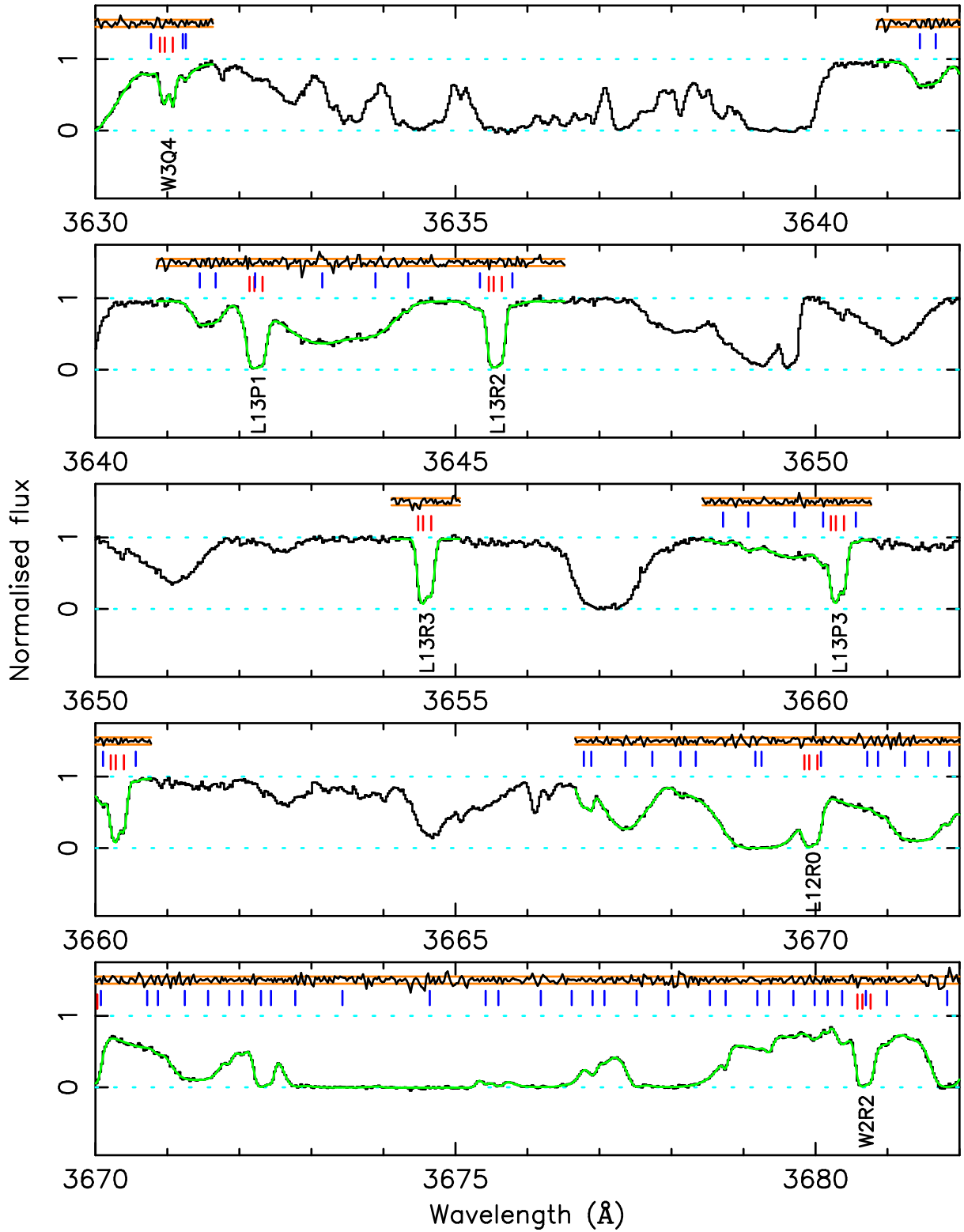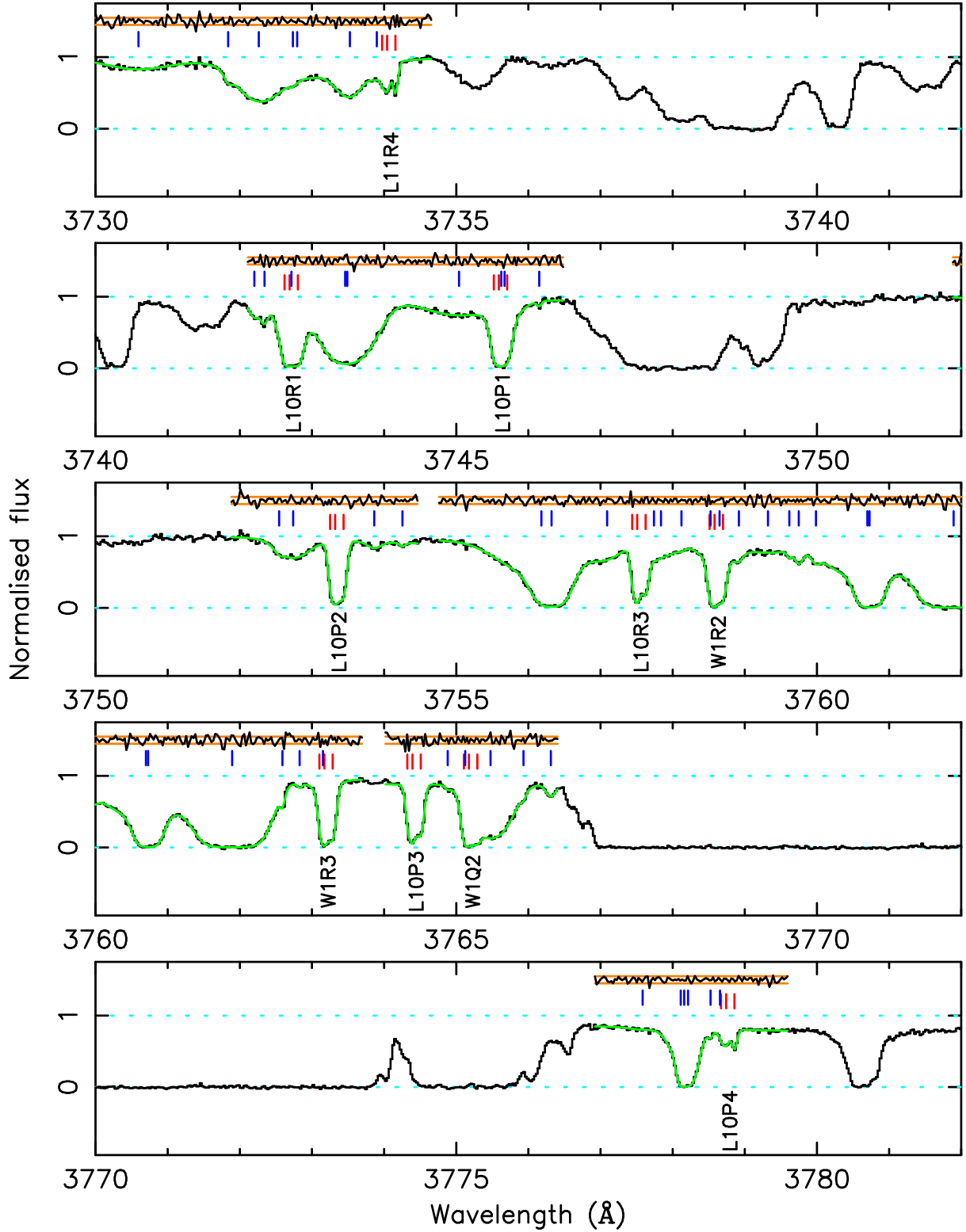
Figure A3. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528$-$250 (part 3). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H$_2$ transitions are plotted below the data.
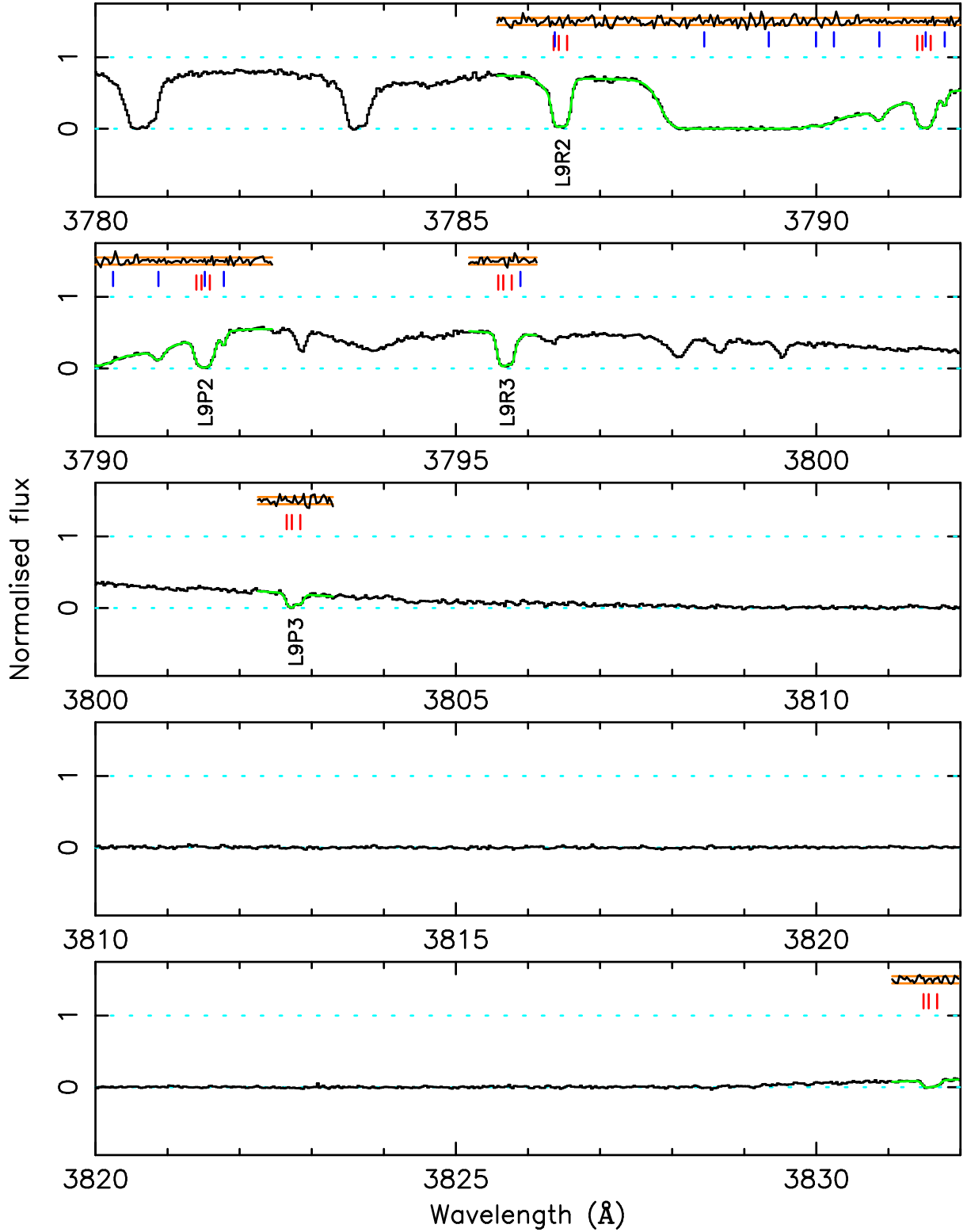
Figure A4. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 4). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H$_2$ transitions are plotted below the data.
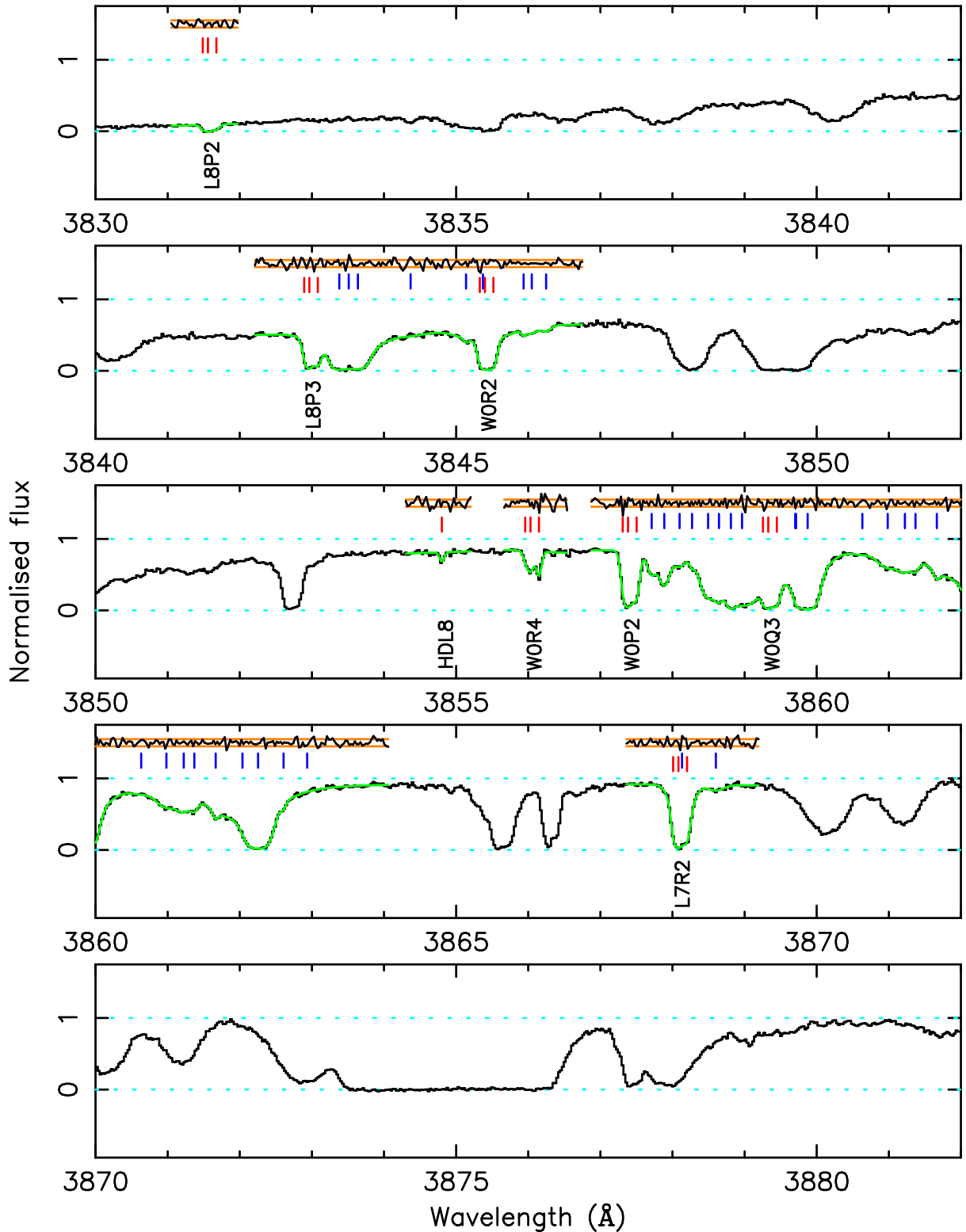
Figure A5. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 5). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.
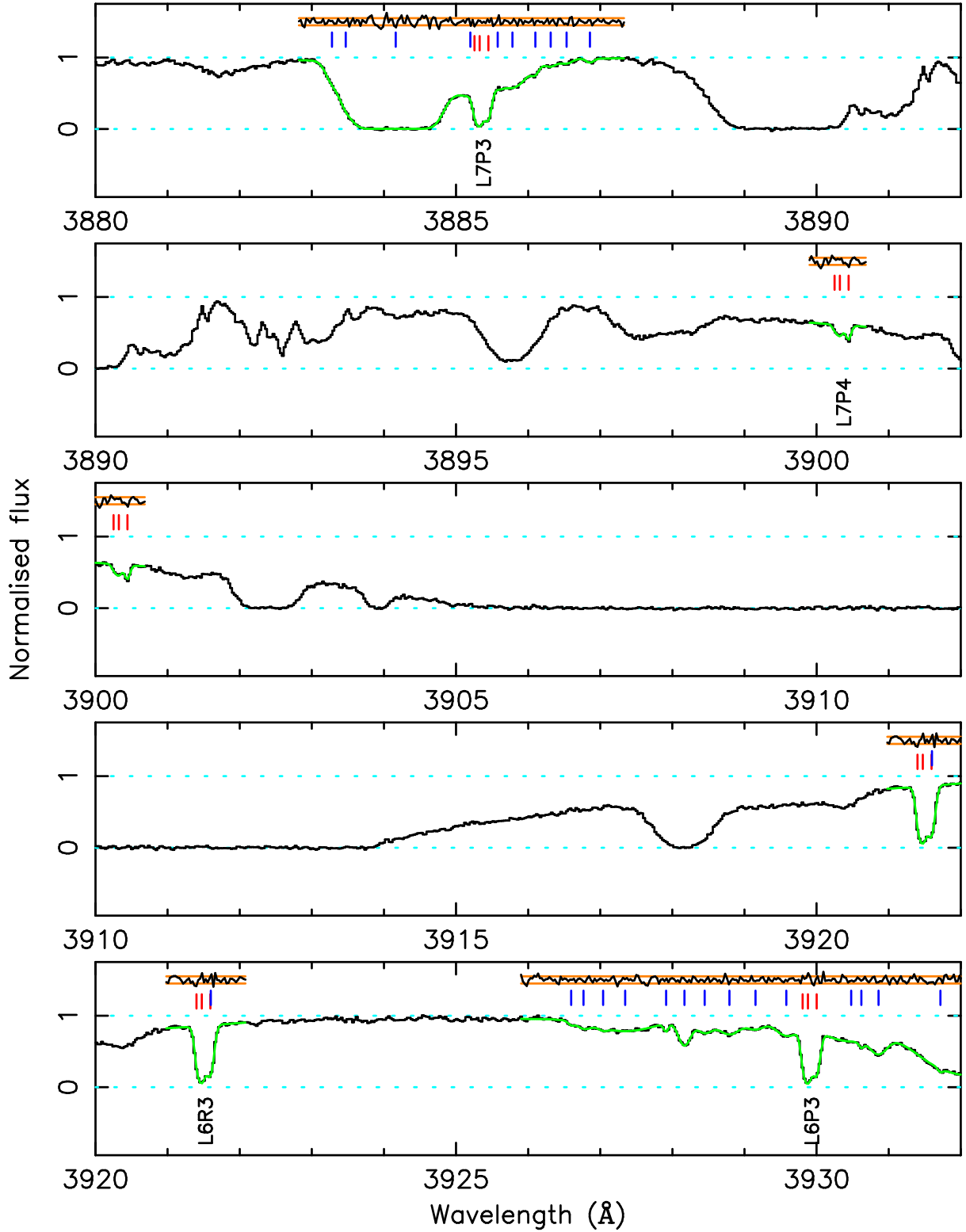
Figure A6. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 6). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.

Figure A7. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 7). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.
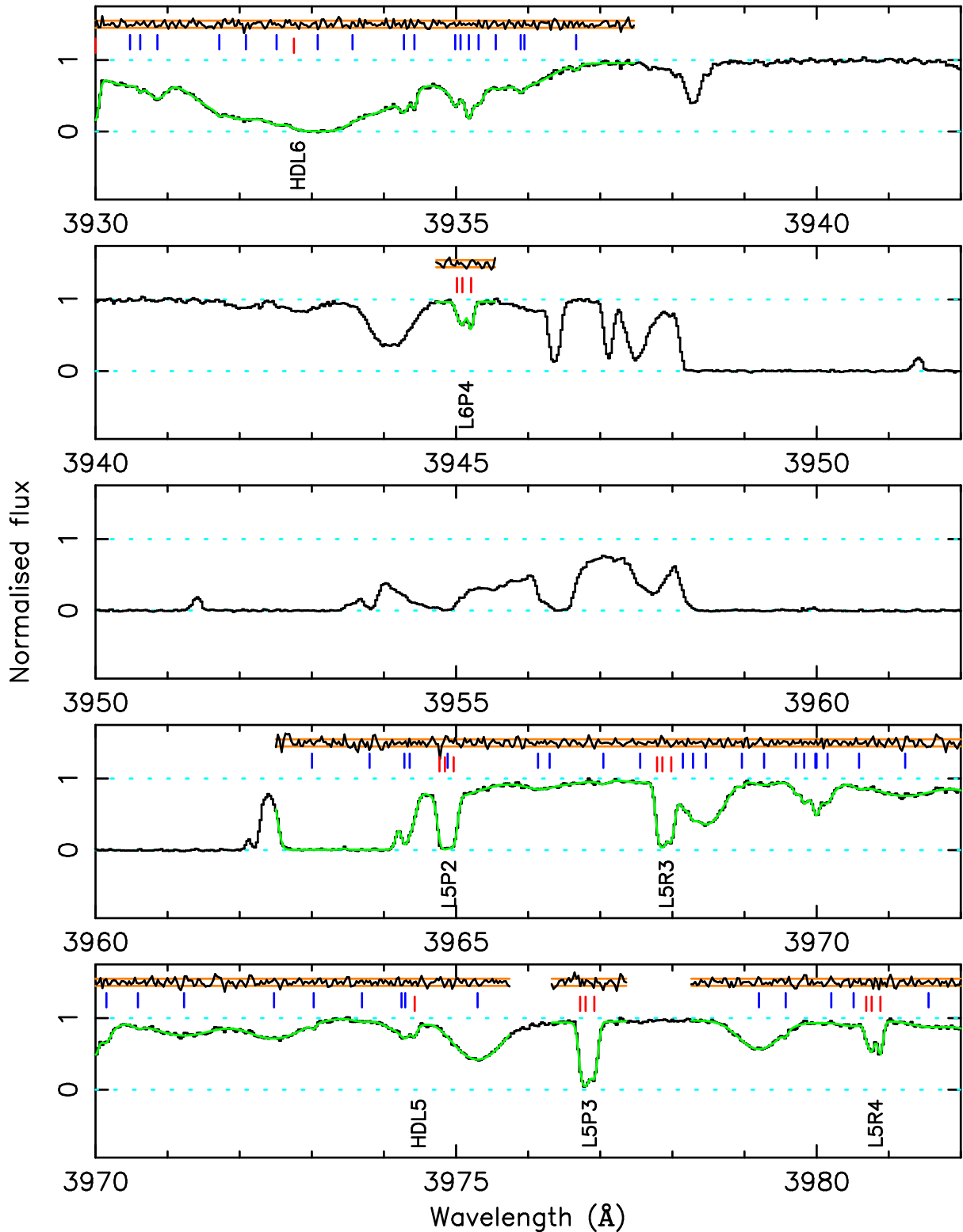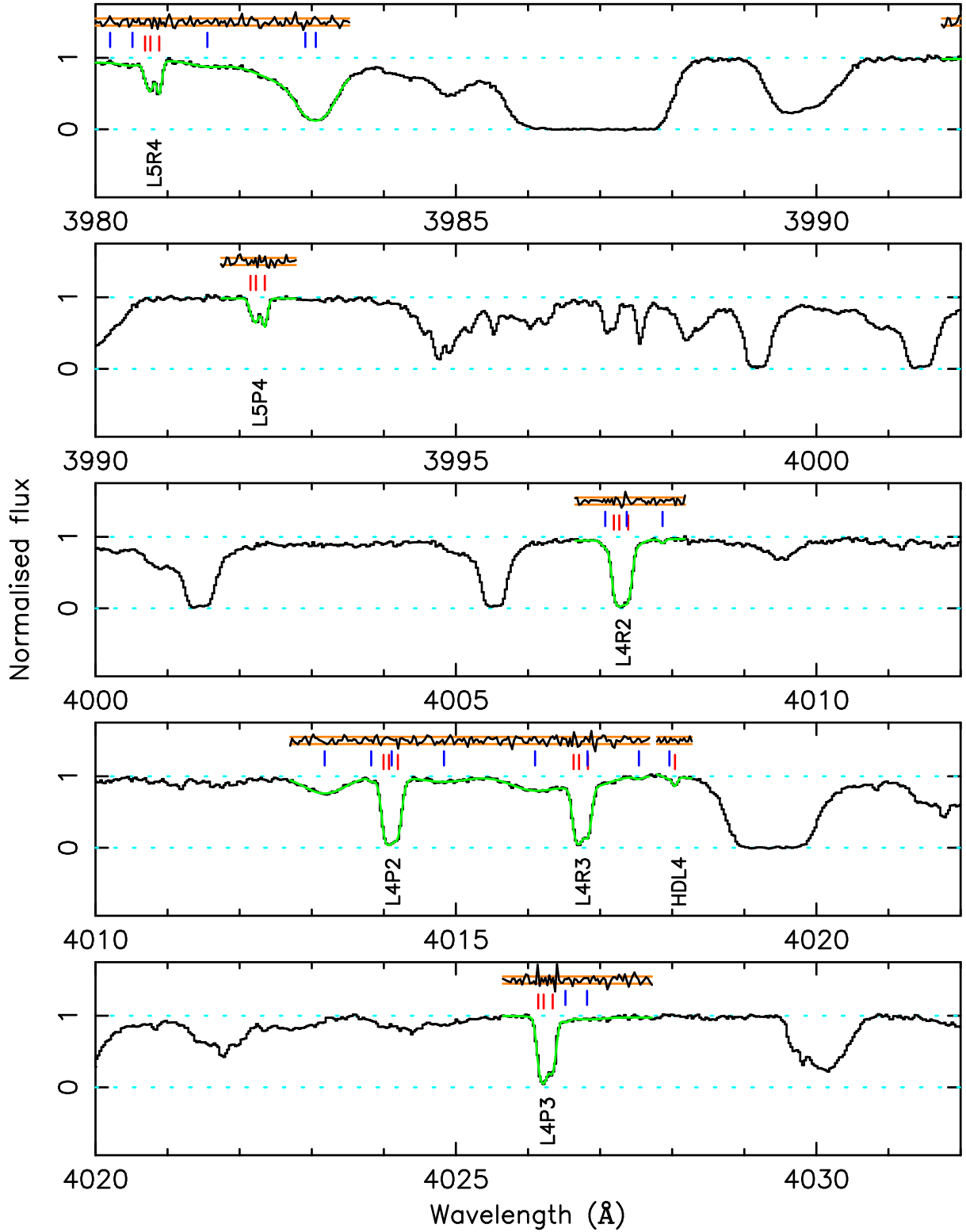
Figure A8. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 8). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm1\sigma$. Labels for the H$_2$ transitions are plotted below the data.
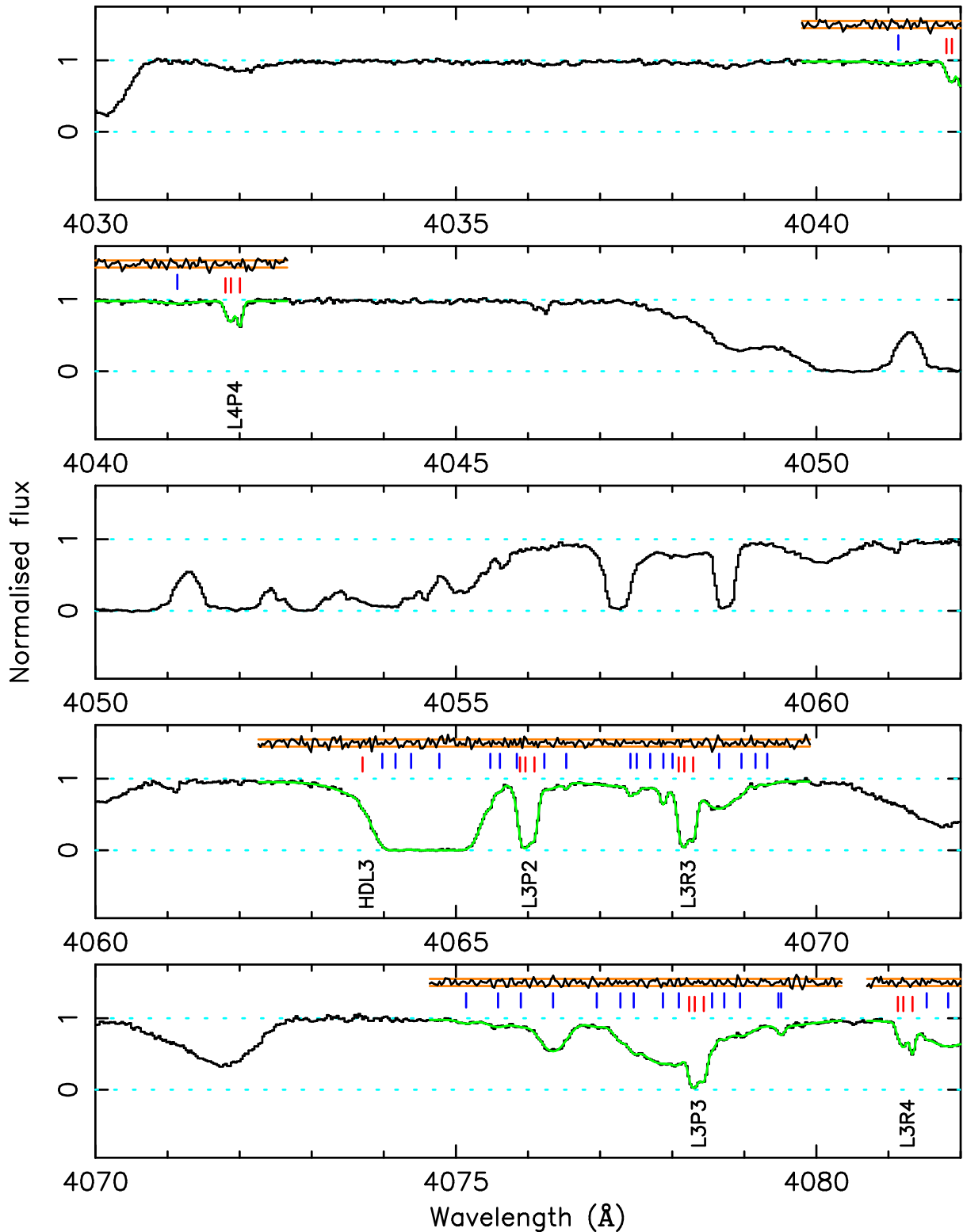
Figure A9. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 9). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.
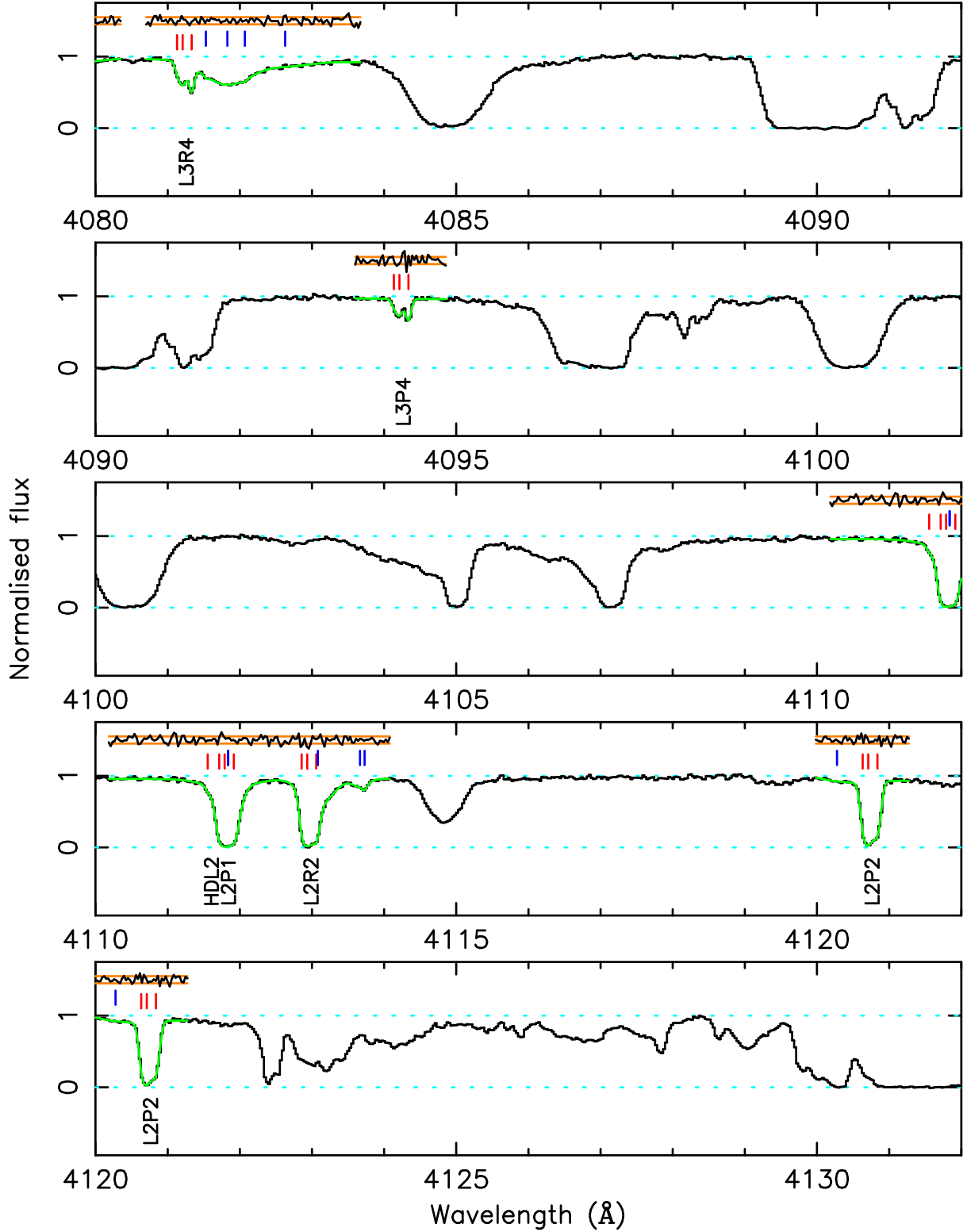
Figure A10. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 10). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm1\sigma$. Labels for the H$_2$ transitions are plotted below the data.
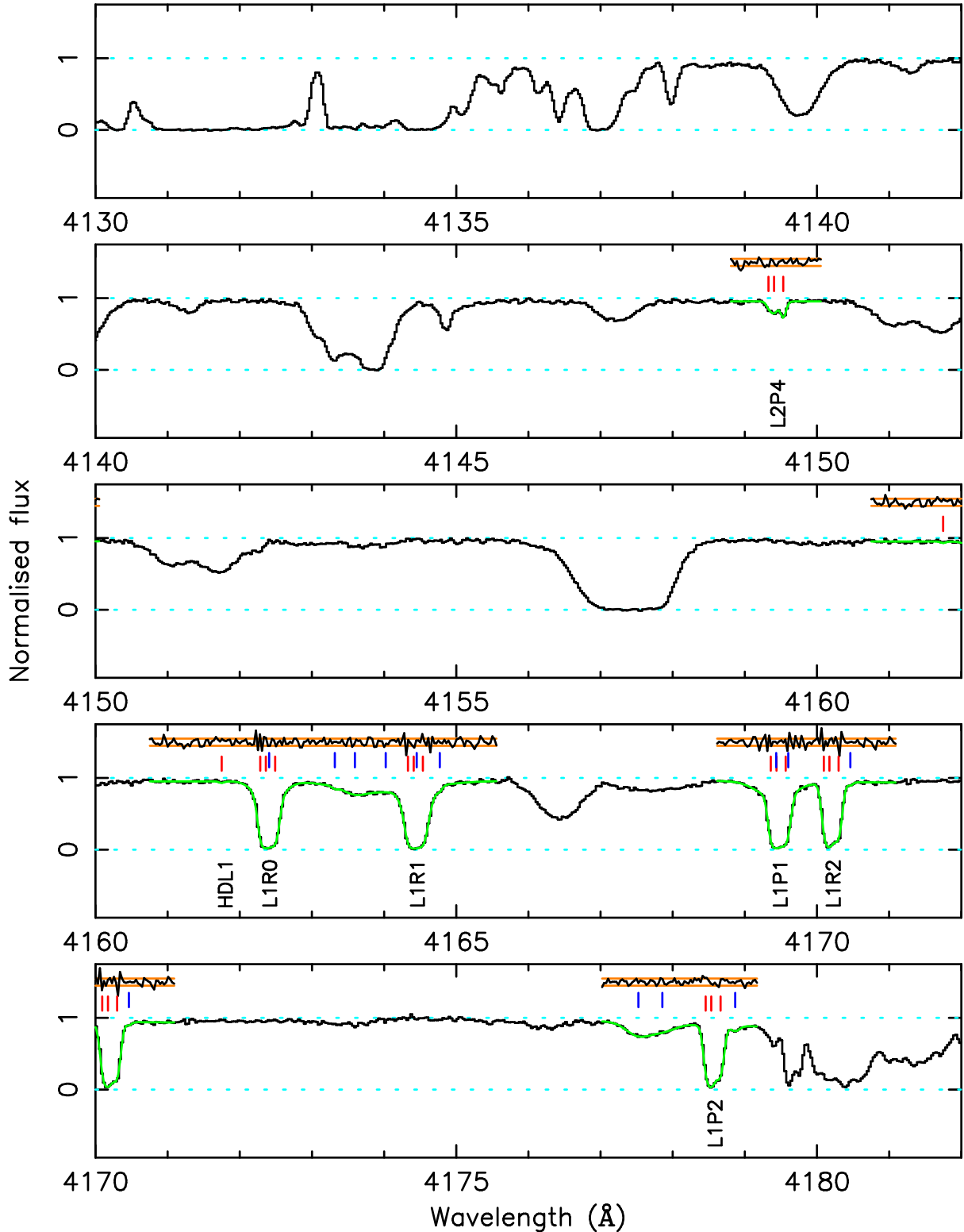
Figure A11. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 11). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H$_2$ transitions are plotted below the data.
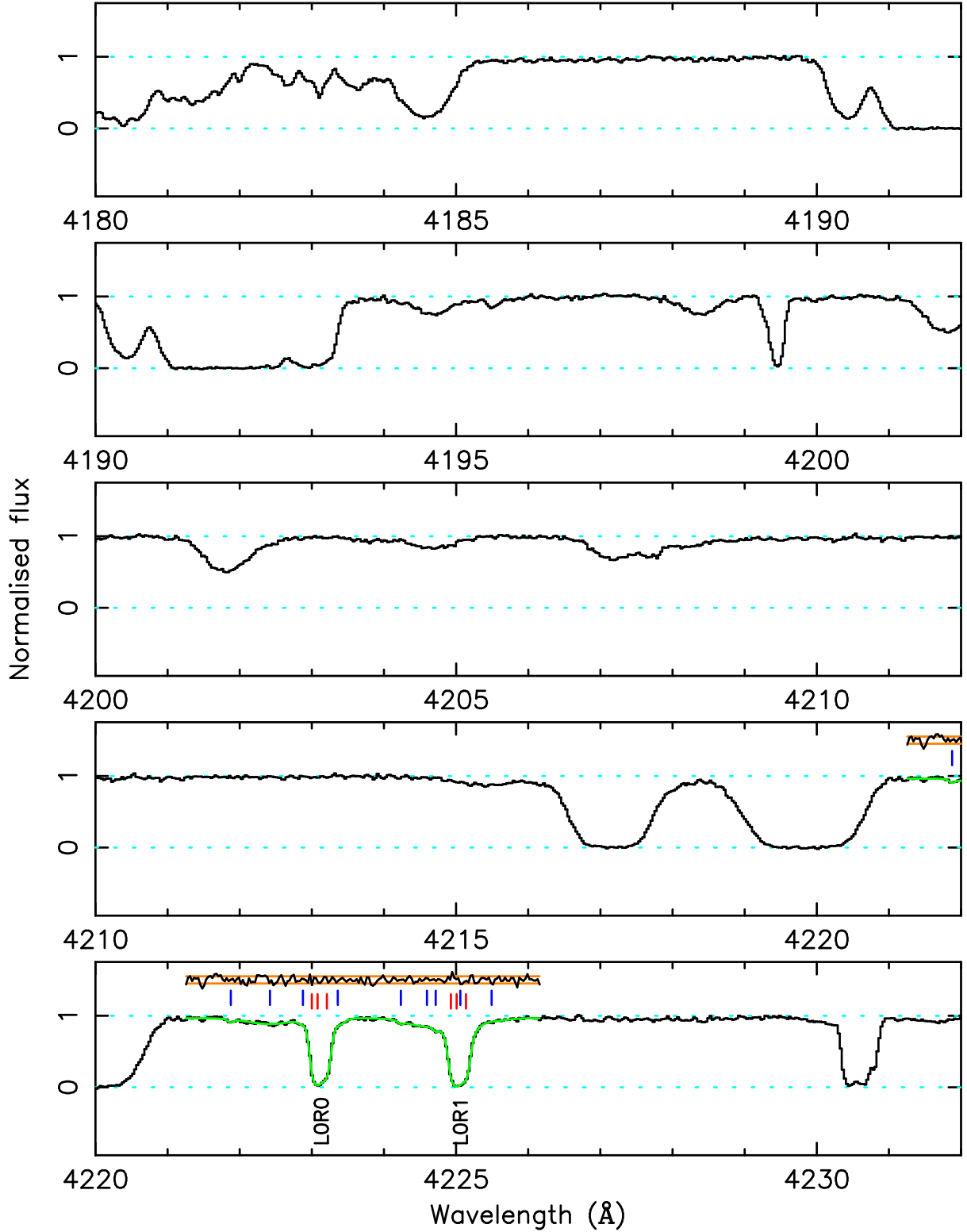
Figure A12. H$_2$/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 12). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H$_2$/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H$_2$ transitions are plotted below the data.

Figure A13. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 13). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.

Figure A14. H_2/HD fit for the $z = 2.811$ absorber toward Q0528−250 (part 14). The vertical axis shows normalised flux. The model fitted to the spectrum is shown in green. Red tick marks indicate the position of H_2/HD components, whilst blue tick marks indicate the position of blending transitions (presumed to be Lyman-α). Normalised residuals (i.e. [data - model]/error) are plotted above the spectrum between the orange bands, which represent $\pm 1\sigma$. Labels for the H_2 transitions are plotted below the data.