

Table 5.6 – *HeII* $\lambda 4686$ profile parameters of the 2011 periastron passage.

| Delta Scorpii: HeII 4686 | | | | |
|--------------------------|------------------|------------|---------|--------------|
| Date | MHJD+ 2455000 | RV km/s | EW A | FWHM km/s |
| 20110503 | 685.51 | -14.11 | 0.17 | 196.13 |
| 20110511 | 692.53 | -9.27 | 0.14 | 184.52 |
| 20110522 | 704.44 | -13.57 | 0.18 | 211.85 |
| 20110528 | 710.4 | -16.77 | 0.16 | 198.13 |
| 20110614 | 727.44 | -28.94 | 0.15 | 191.75 |
| 20110615 | 728.46 | -27.02 | 0.21 | 229.09 |
| 20110618 | 731.42 | -38.54 | 0.15 | 198.81 |
| 20110626 | 739.39 | -36.62 | 0.17 | 222.73 |
| 20110701 | 744.39 | -46.87 | 0.17 | 230.59 |
| 20110702 | 745.5 | -55.19 | 0.2 | 230.12 |
| 20110704 | 747.38 | -56.47 | 0.17 | 214.48 |
| 20110705 | 748.48 | -43.81 | 0.14 | 194.61 |
| 20110708 | 751.37 | -39.18 | 0.16 | 192.07 |
| 20110709 | 752.38 | -43.66 | 0.15 | 194.87 |
| 20110710 | 753.37 | -32.14 | 0.16 | 198.34 |
| 20110711 | 754.38 | -42.38 | 0.17 | 210.05 |
| 20110717 | 760.4 | -37.9 | 0.18 | 199.57 |

We also investigated the effects of the close encounter on the star's rotation. We used the photospheric line *HeII* $\lambda 4686$ to study the star's rotation, because this line was found unlikely to be affected by the lines from the circumstellar disc based on the observations. Table 5.6 lists the values of the line parameters: radial velocity, *RV*; equivalent width, *EW* and *FWHM* and Figure 5.37 shows the variations of the parameters with time. It shows that *FWHM* values were increasing and *EW* values also show an increment pattern when the companion approaches its primary, which was shown by the *RV* measurements. Based on the values of *RV*, *EW* and *FWHM* from 1st to 8th July 2011, we were expecting the close encounter to have occurred between 2nd to 4th July 2011. The increment values of *FWHM* of *HeII* $\lambda 4686$ during the periastron passage probably show that the rotation speed of this layer being affected by the event.

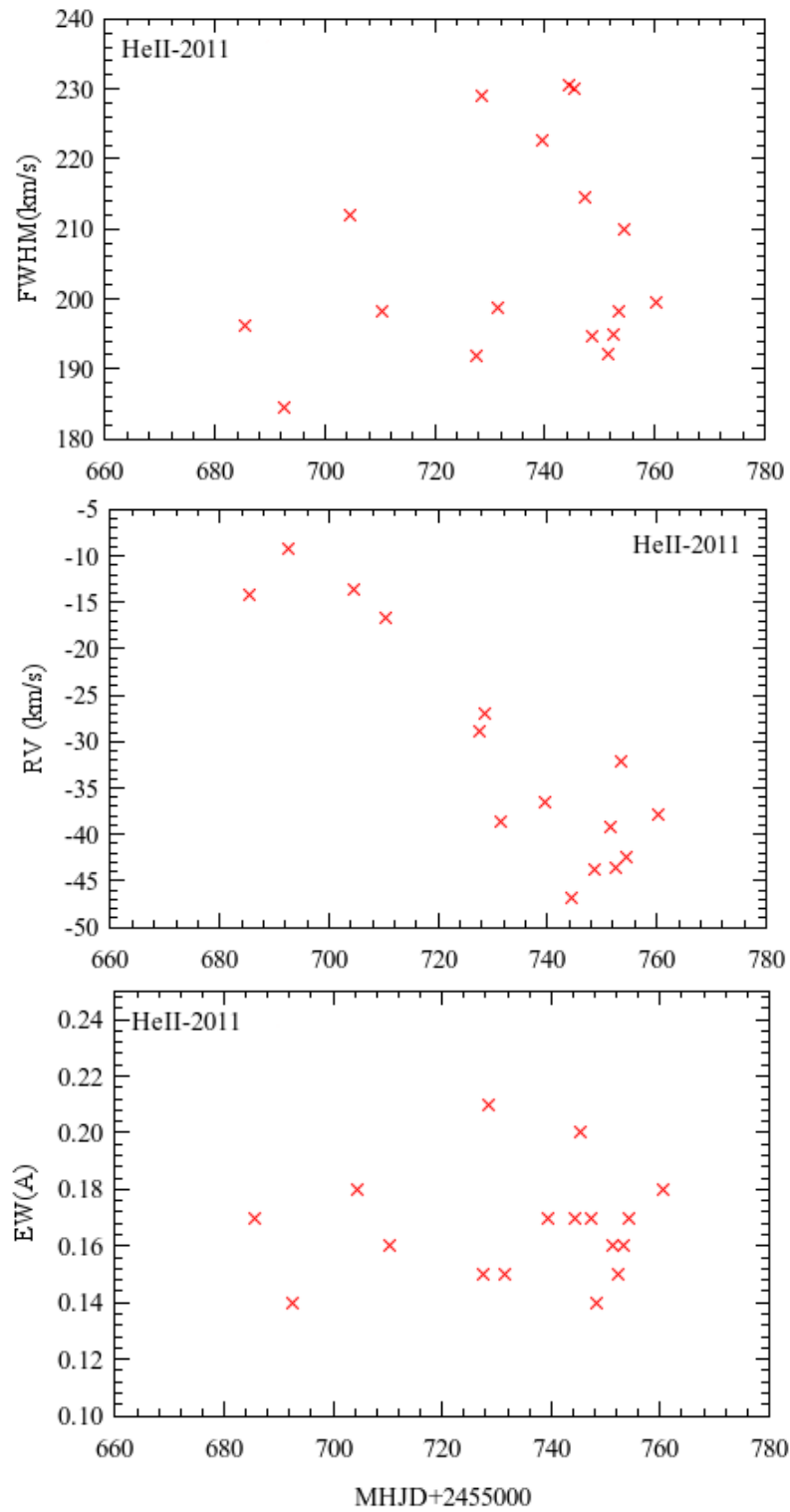


Figure 5.37 – Variation of *FWHM*, *RV* and *EW* values of *HeII* $\lambda 4686$ during the recent periastron passage in early July 2011.