

GIARPS High-resolution Observations of T Tauri stars (GHOsT)

II. Connecting atomic and molecular winds in protoplanetary disks (*Corrigendum*)

M. Gangi¹, B. Nisini¹, S. Antoniucci¹, T. Giannini¹, K. Biazzo¹, J. M. Alcalá², A. Frasca³, U. Munari⁴,
A. A. Arkharov⁵, A. Harutyunyan⁶, C. F. Manara⁷, E. Rigliaco⁸, and F. Vitali¹

¹ INAF – Osservatorio Astronomico di Roma – Via Frascati 33, 00078 Monte Porzio Catone, Italy
e-mail: manuele.gangi@inaf.it

² INAF – Osservatorio Astronomico di Capodimonte – Salita Moiariello 16, 80131 Napoli, Italy

³ INAF – Osservatorio Astrofisico di Catania – Via S. Sofia 78, 95123 Catania, Italy

⁴ INAF – Osservatorio Astronomico di Padova, Via dell'Osservatorio 8, 36012 Asiago (VI), Italy

⁵ Central Astronomical Observatory of Pulkovo, Pulkovskoe shosse 65, 196140 St. Petersburg, Russia

⁶ Fundación Galileo Galilei – INAF – Telescopio Nazionale Galileo, 38700 Breña Baja, Santa Cruz de Tenerife, Spain

⁷ European Southern Observatory, Karl-Schwarzschild-Strasse 2, 85748 Garching bei München, Germany

⁸ INAF – Osservatorio Astronomico di Padova, vicolo dell'Osservatorio 5, 35122 Padova, Italy

A&A, 643, A32 (2020), <https://doi.org/10.1051/0004-6361/202038534>

Key words. stars: pre-main sequence – stars: winds, outflows – techniques: spectroscopic – line: profiles – errata, addenda

Due to a wrong conversion of flux units in the infrared (IR) spectral range, the H₂ profiles were erroneously reported with a flux a factor of 10 higher than the correct one.

The values of the H₂ peak intensities, fluxes, and luminosities in Tables 3, 4, and A.1 have now been corrected. Here we also publish Figs. 1, 2, 5, 6, 7, and A.1 with the correct flux scale.

Consequently, the second paragraph of Sect. 5.3, should read as follows: “From Fig. 5 we see that about half of the sources where H₂ has been detected have a similar H₂ and [OI] luminosity, while in the other half of the sample the H₂ luminosity is significantly lower than the [OI] luminosity.”

Acknowledgements. We are grateful to Christian Rab for pointing out the error in our manuscript.

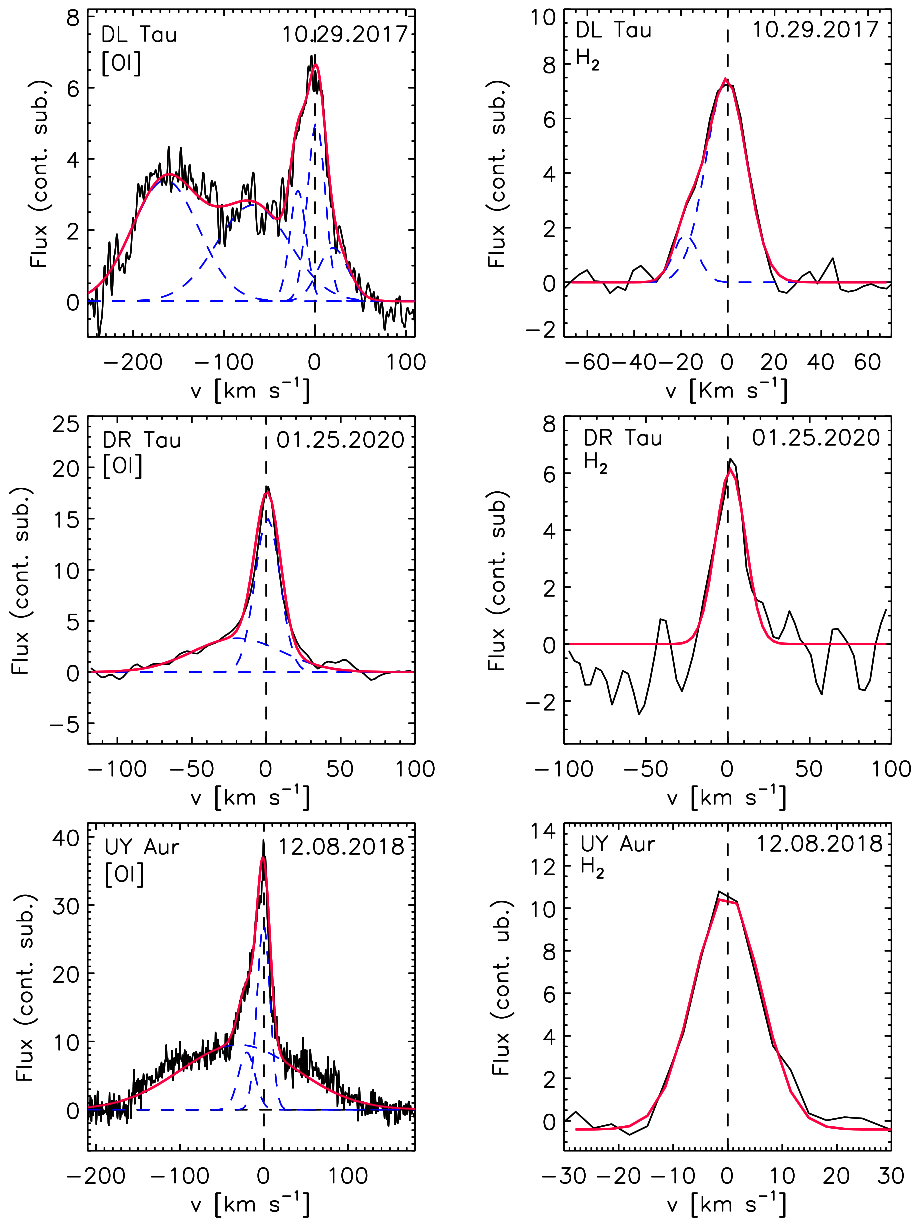


Fig. 1. Example of Gaussian decomposition of continuum-subtracted [O I] and H₂ line profiles (black lines). The fit to the profile is in red, while single components are shown with blue dashed lines. Flux units are 10^{-15} erg s⁻¹ cm⁻² Å⁻¹. For each panel, the target name and date of observation (MM.DD.YYYY) are indicated. The complete sample is reported in Fig. A.1.

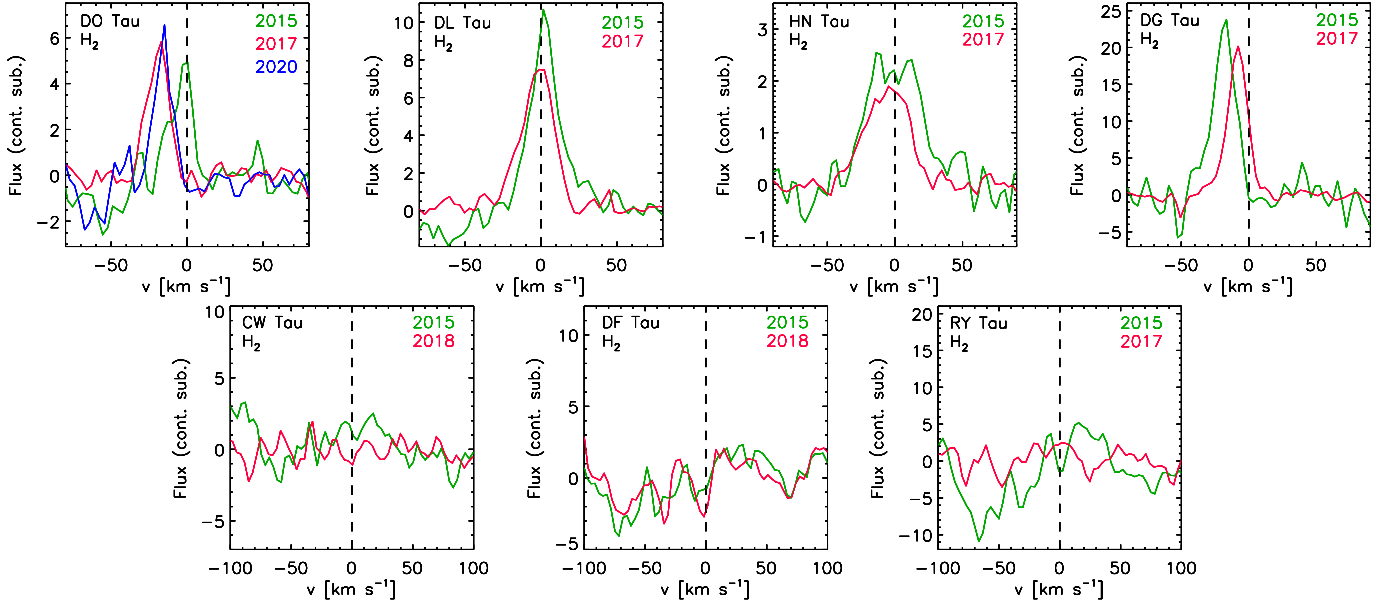


Fig. 2. Continuum-subtracted H₂ line profiles variability for DO Tau, DL Tau, HN Tau, DG Tau, CW Tau, DF Tau and RY Tau. Flux units are $10^{-15} \text{ ergs}^{-1} \text{ cm}^{-2} \text{ \AA}^{-1}$.

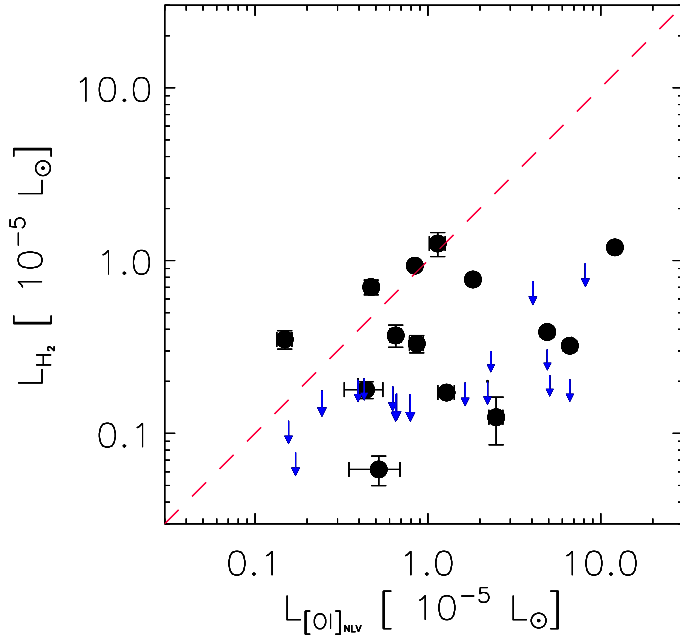


Fig. 5. Correlations between extinction-corrected luminosities of the [O I] and H₂ NLVC. The red dashed line represents the one-to-one correlation. Upper limits are indicated with blue arrows.

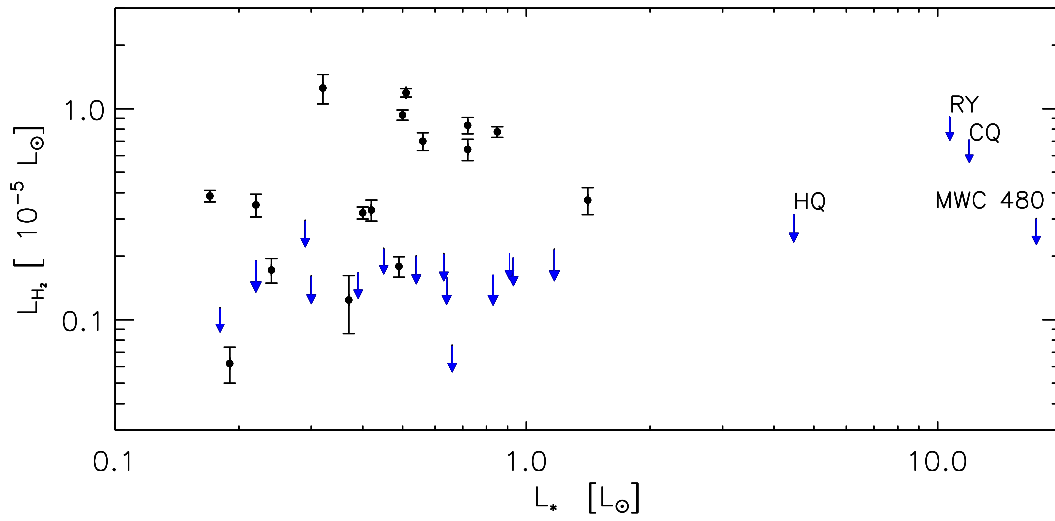


Fig. 6. Correlation between star luminosities and extinction-corrected luminosities of the H_2 NLVC. Upper limits are indicated with blue arrows.

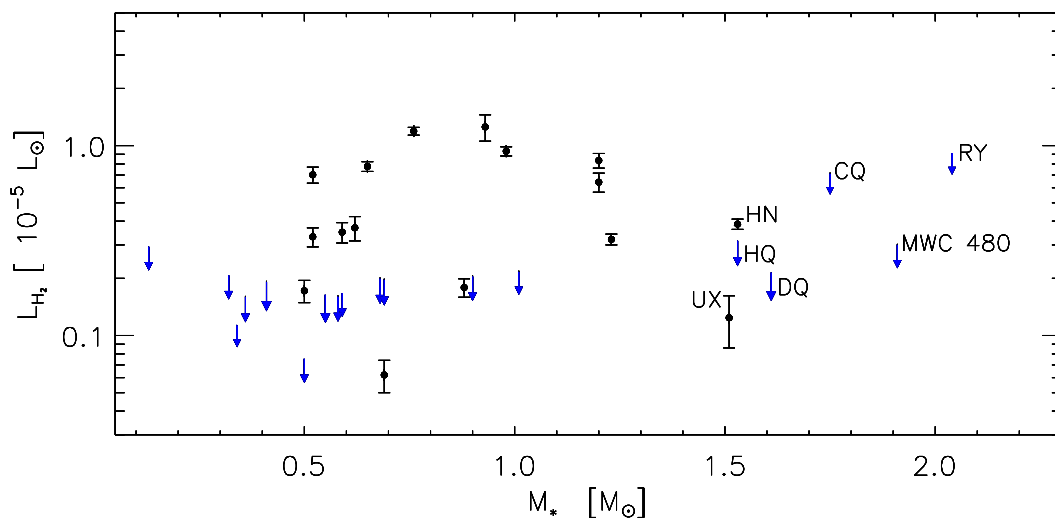


Fig. 7. Correlation between star masses and extinction-corrected luminosities of the H_2 NLVC. Upper limits are indicated with blue arrows.

Table 3. Line kinematic parameters of the NLVC for the [O I] and H₂ profiles.

Source	Obs date	NLVC - [O I]			NLVC - H ₂		
		v_p [km s ⁻¹]	$FWHM$ [km s ⁻¹]	$I_p (\times 10^{-15})$ [erg s ⁻¹ cm ⁻² Å ⁻¹]	v_p [km s ⁻¹]	$FWHM$ [km s ⁻¹]	$I_p (\times 10^{-15})$ [erg s ⁻¹ cm ⁻² Å ⁻¹]
BP Tau	26 Jan. 2020	2.5 ± 2.2	31.7 ± 4.4	16.4 ± 2.1	5.6 ± 2.4	27.3 ± 5.6	2.3 ± 0.3
CI Tau	09 Dec. 2018	-1.5 ± 2.0	18.7 ± 2.0	2.7 ± 4.0	ND	ND	ND
CoKu HP Tau G2	25 Jan. 2020	ND	ND	ND	ND	ND	ND
CQ Tau	13 Nov. 2017	3.3 ± 3.4	29.3 ± 4.5	16.7 ± 2.0	ND	ND	ND
CW Tau	20 Dec. 2015	–	–	–	ND	ND	ND
	08 Dec. 2018	1.6 ± 4.2	35.2 ± 8.4	28.5 ± 3.0	ND	ND	ND
DD Tau	19 Dec. 2015	–	–	–	-19.1 ± 2.0	12.5 ± 0.7	4.2 ± 0.2
DF Tau	20 Dec. 2015	–	–	–	ND	ND	ND
	08 Dec. 2018	-7.8 ± 2.5	37.6 ± 4.7	9.8 ± 0.9	ND	ND	ND
DG Tau	19 Dec. 2015	–	–	–	-17.1 ± 2.2	15.0 ± 2.1	23.5 ± 2.3
	29 Oct. 2017	-6.8 ± 0.4	16.3 ± 0.2	205.0 ± 4.6	-7.8 ± 1.0	14.2 ± 1.3	19.8 ± 1.3
DH Tau	02 Nov. 2019	1.9 ± 0.4	44.5 ± 1.2	6.6 ± 0.1	ND	ND	ND
DK Tau	08 Dec. 2018	-2.4 ± 9.8	61.8 ± 18.5	18.0 ± 3.0	ND	ND	ND
DL Tau	20 Dec. 2015	–	–	–	2.6 ± 2.8	15.9 ± 4.7	10.3 ± 1.6
	29 Oct. 2017	2.7 ± 3.4	22.9 ± 5.9	5.0 ± 1.2	-0.6 ± 1.4	19.1 ± 2.6	7.4 ± 0.9
DN Tau	01 Nov. 2019	-4.3 ± 2.0	45.2 ± 1.1	9.9 ± 0.2	ND	ND	ND
DO Tau	19 Dec. 2015	–	–	–	-1.5 ± 2.4	9.2 ± 1.1	5.0 ± 0.6
	13 Nov. 2017	-17.3 ± 2.7	34.6 ± 4.1	23.1 ± 1.8	-17.3 ± 1.5	11.5 ± 2.7	6.0 ± 1.0
	26 Jan. 2020	-14.3 ± 3.2	24.8 ± 7.7	24.5 ± 3.3	-15.7 ± 2.1	11.1 ± 1.5	5.9 ± 0.6
DQ Tau	02 Nov. 2019	-4.9 ± 2.1	26.9 ± 1.8	30.0 ± 0.9	ND	ND	ND
DR Tau	25 Jan. 2020	0.9 ± 1.5	19.8 ± 1.4	15.0 ± 0.9	1.7 ± 1.	20.6 ± 2.3	6.1 ± 0.6
DS Tau	01 Nov. 2019	3.8 ± 2.2	52.5 ± 2.7	4.6 ± 0.2	1.4 ± 2.6	26.7 ± 4.1	0.4 ± 0.1
FT Tau	25 Jan. 2020	-18.0 ± 8.0	37.6 ± 10.6	1.3 ± 0.3	ND	ND	ND
GG Tau	09 Dec. 2018	-0.4 ± 2.6	20.6 ± 5.8	10.5 ± 2.3	1.7 ± 4.0	22.5 ± 7.0	3.3 ± 0.5
GH Tau	25 Jan. 2020	-5.0 ± 4.3	68.2 ± 12.0	5.9 ± 0.7	ND	ND	ND
GI Tau	26 Jan. 2020	-1.5 ± 3.7	28.1 ± 8.4	2.8 ± 0.5	1.8 ± 1.4	29.9 ± 3.3	5.1 ± 0.5
GK Tau	02 Nov. 2019	-5.4 ± 2.0	36.6 ± 0.9	11.8 ± 0.2	ND	ND	ND
GM Aur	09 Dec. 2018	-0.9 ± 3.9	11.0 ± 4.9	17.8 ± 2.2	-1.4 ± 1.7	17.6 ± 2.8	1.6 ± 0.2
HL Tau	24 Nov. 2016	–	–	–	-8.7 ± 3.0	12.0 ± 0.2	–
HN Tau	19 Dec. 2015	–	–	–	-1.5 ± 2.2	42.2 ± 2.1	2.3 ± 0.1
	29 Oct. 2017	-7.5 ± 1.8	47.6 ± 1.3	31.5 ± 0.6	-5.3 ± 3.4	37.6 ± 1.8	1.9 ± 0.1
HQ Tau	01 Nov. 2019	-6.4 ± 2.1	48.8 ± 1.9	7.4 ± 0.2	ND	ND	ND
IP Tau	09 Dec. 2018	-36.7 ± 2.4	43.9 ± 1.8	2.6 ± 0.7	ND	ND	ND
IQ Tau	02 Nov. 2019	1.8 ± 4.9	25.4 ± 13.4	21.5 ± 5.6	3.3 ± 2.5	15.0 ± 3.0	2.8 ± 0.01
MWC 480	01 Nov. 2019	-13.2 ± 2.2	30.5 ± 2.1	38.8 ± 2.2	ND	ND	ND
RW Aur A	13 Nov. 2017	ND	ND	ND	-2.6 ± 3.0	16.6 ± 5.2	7.2 ± 1.9
RY Tau	20 Dec. 2015	–	–	–	ND	ND	ND
	13 Nov. 2017	-10.4 ± 6.2	38.9 ± 11.8	42.4 ± 9.4	ND	ND	ND
UX Tau	26 Jan. 2020	-2.0 ± 0.5	27.7 ± 2.2	48.5 ± 2.4	-6.0 ± 1.1	11.2 ± 2.7	2.3 ± 0.4
UY Aur	08 Dec. 2018	-0.5 ± 1.9	18.2 ± 3.4	27.1 ± 3.7	-0.3 ± 1.7	12.7 ± 0.5	10.7 ± 0.6
UZ Tau E	09 Dec. 2018	-0.1 ± 5.4	54.1 ± 9.4	50.2 ± 7.5	1.3 ± 2.8	41.3 ± 5.8	1.6 ± 0.2
V409 Tau	26 Jan. 2020	21.0 ± 12.9	54.1 ± 42.9	1.2 ± 0.4	ND	ND	ND
V836 Tau	02 Nov. 2019	-4.2 ± 2.0	42.8 ± 1.2	4.8 ± 0.1	ND	ND	ND
XZ Tau	14 Mar. 2017	-0.9 ± 1.9	13.1 ± 3.8	–	-5.8 ± 1.8	16.9 ± 0.5	–

Notes. ND: profile not detected, “–”: spectrum not acquired.

Table 4. H₂ and [O I] extinction-corrected luminosity of the NLV component.

Source	Obs date	H ₂ [10 ⁻⁵ L _⊙]	[O I] _{NLV} [10 ⁻⁵ L _⊙]
BP Tau	25 Jan. 2020	0.30 ± 0.04	0.9 ± 0.1
CI Tau	09 Dec. 2018	<0.15	0.4 ± 0.1
CoKu HP Tau G2	25 Jan. 2020	<0.21	–
CQ Tau	13 Nov. 2017	<0.56	4.0 ± 0.2
CW Tau	20 Dec. 2015	<0.21	–
	08 Dec. 2018	<0.17	5.1 ± 0.2
DD Tau	19 Dec. 2015	<0.22	–
DF Tau	20 Dec. 2015	<0.21	–
	08 Dec. 2018	<0.16	0.4 ± 0.1
DG Tau	20 Dec. 2015	1.48 ± 0.07	–
	29 Oct. 2017	1.19 ± 0.06	12.1 ± 0.5
DH Tau	02 Nov. 2019	<0.14	0.6 ± 0.1
DK Tau	08 Dec. 2018	<0.15	2.2 ± 0.1
DL Tau	20 Dec. 2015	1.11 ± 0.06	–
	29 Oct. 2017	0.93 ± 0.05	0.8 ± 0.1
DN Tau	01 Nov. 2019	<0.12	0.8 ± 0.1
DO Tau	19 Dec. 2015	0.26 ± 0.01	–
	13 Nov. 2017	0.32 ± 0.04	1.9 ± 0.1
	26 Jan. 2020	0.35 ± 0.04	1.5 ± 0.1
DQ Tau	02 Nov. 2019	<0.15	6.6 ± 0.6
DR Tau	25 Jan. 2020	1.25 ± 0.20	1.1 ± 0.1
DS Tau	01 Nov. 2019	0.06 ± 0.01	0.5 ± 0.2
FT Tau	25 Jan. 2020	<0.09	0.2 ± 0.1
GG Tau	09 Dec. 2018	0.37 ± 0.05	0.6 ± 0.1
GH Tau	25 Jan. 2020	<0.12	0.6 ± 0.1
GI Tau	26 Jan. 2020	0.70 ± 0.07	0.5 ± 0.1
GK Tau	02 Nov. 2019	<0.15	1.6 ± 0.2
GM Aur	09 Dec. 2018	0.18 ± 0.02	0.4 ± 0.1
HL Tau	24 Nov. 2016	–	–
HN Tau	19 Dec. 2015	0.53 ± 0.02	–
	29 Oct. 2017	0.39 ± 0.02	4.9 ± 0.2
HQ Tau	01 Nov. 2019	<0.23	4.9 ± 0.5
IP Tau	09 Dec. 2018	<0.13	0.2 ± 0.1
IQ Tau	02 Nov. 2019	0.17 ± 0.02	1.3 ± 0.1
MWC480	01 Nov. 2019	<0.23	2.3 ± 0.8
RW Aur A	13 Nov. 2017	0.83 ± 0.07 - 0.64 ± 0.07 ⁽¹⁾	–
RY Tau	20 Dec. 2015	<0.70	–
	13 Nov. 2017	<0.71	8.1 ± 0.4
UX Tau	26 Jan. 2020	0.12 ± 0.04	2.5 ± 0.2
UY Aur	08 Dec. 2018	0.78 ± 0.05	1.8 ± 0.1
UZ Tau E	09 Dec. 2018	0.32 ± 0.02	6.6 ± 0.3
V409 Tau	26 Jan. 2020	<0.06	0.2 ± 0.1
V836 Tau	02 Nov. 2019	<0.12	0.7 ± 0.1
XZ Tau	14 Mar. 2017	–	–

Notes. (1) Different values were obtained from the adoption of different extinction values.

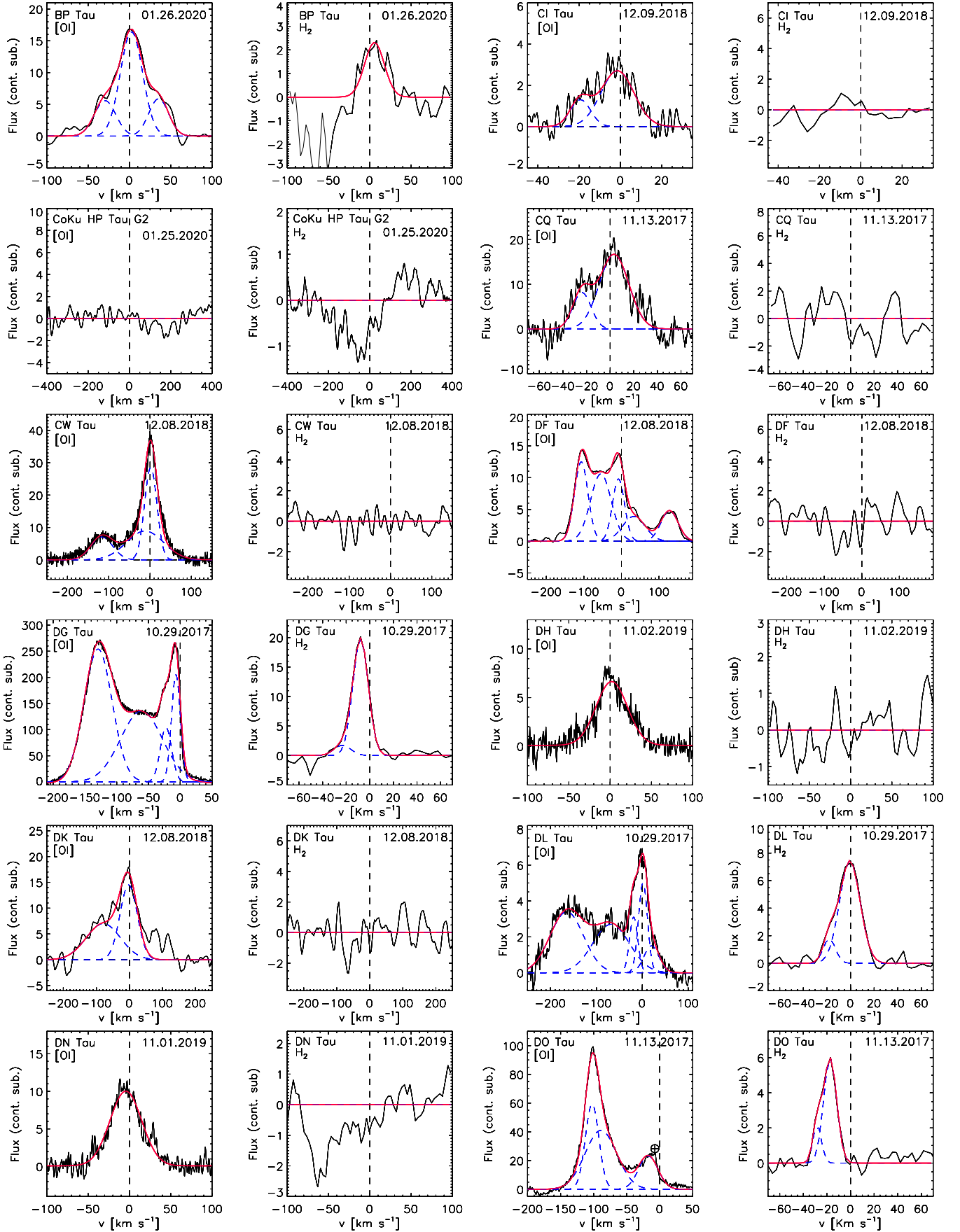


Fig. A.1. Continuum-subtracted [O I] and H₂ line profiles. The fit to the profile is in red, which was obtained by adding single or multiple Gaussians (blue dashed lines). Flux units are 10^{-15} ergs⁻¹ cm⁻² Å⁻¹. For each panel, the target name and date of observation (MM.DD.YYYY) are indicated.

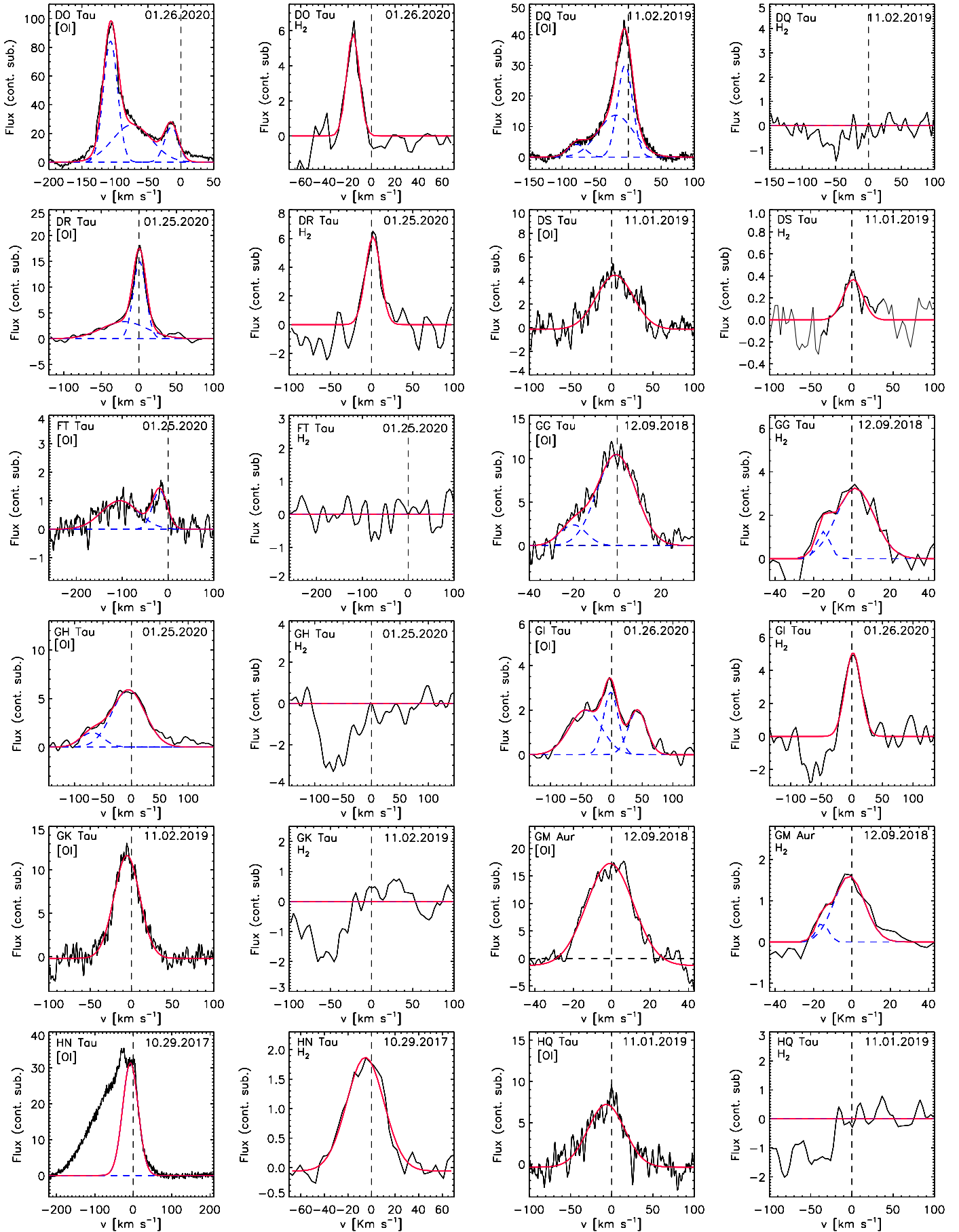


Fig. A.1. continued.

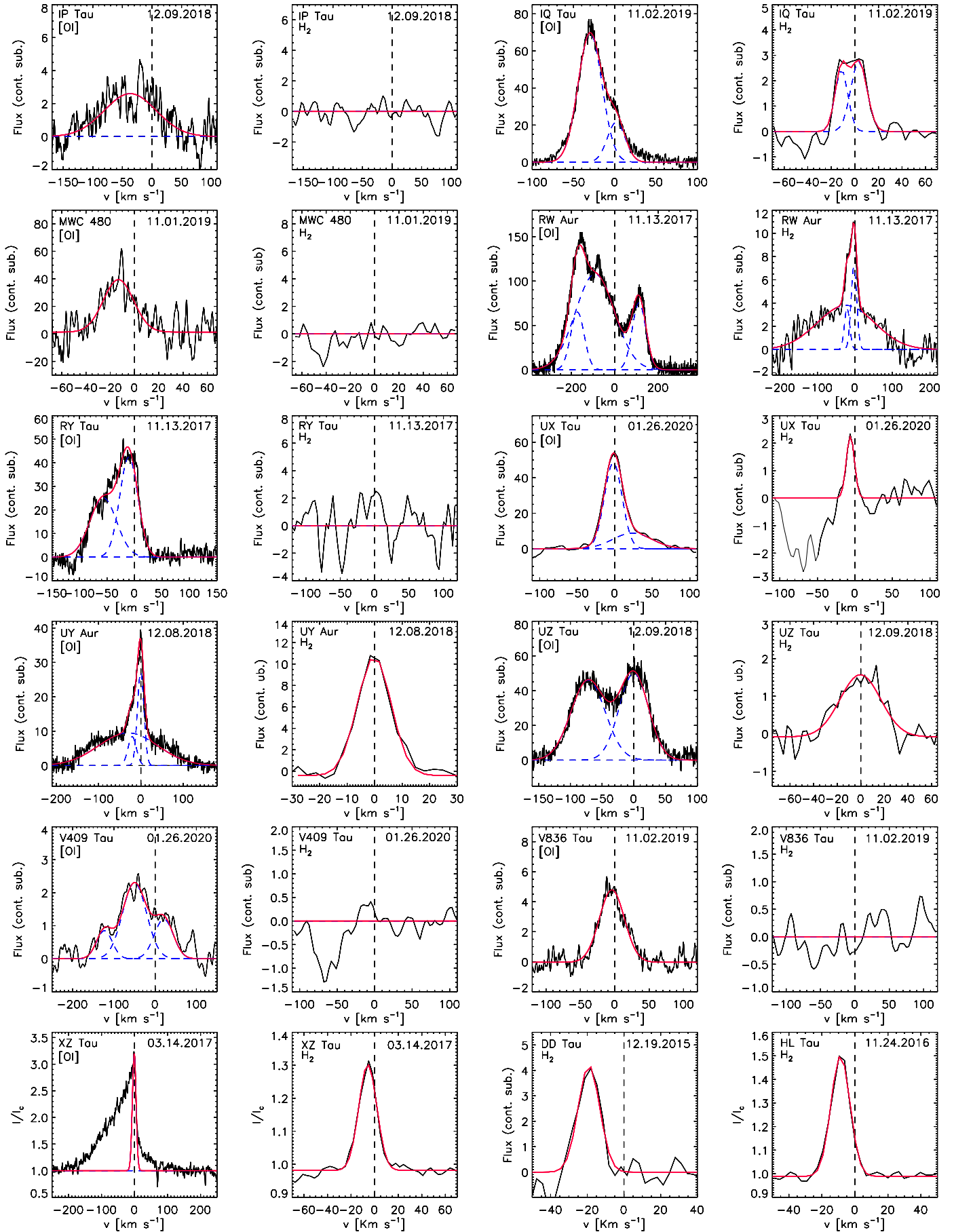


Fig. A.1. continued.

Table A.1. Line kinematic parameters of the Gaussian components having $|v| > 30 \text{ km s}^{-1}$ for the [O I] and H₂ profiles.

Source	Obs date	[O I]			H ₂		
		v_p [km s ⁻¹]	$FWHM$ [km s ⁻¹]	$I_p (\times 10^{-15})$ [erg s ⁻¹ cm ⁻² Å ⁻¹]	v_p [km s ⁻¹]	$FWHM$ [km s ⁻¹]	$I_p (\times 10^{-15})$ [erg s ⁻¹ cm ⁻² Å ⁻¹]
BP Tau	01-26-2020	35.4 ± 6.5	28.1 ± 12.9	5.9 ± 2.1	ND	ND	ND
		-29.5 ± 5.8	30.5 ± 19.5	5.6 ± 2.0	ND	ND	ND
CI Tau	12-09-2018	-19.4 ± 1.8	11.2 ± 5.6	1.3 ± 0.3	ND	ND	ND
CoKu HP	01-25-2020	ND	ND	ND	ND	ND	ND
CQ Tau	11-13-2017	-23.9 ± 3.9	18.1 ± 6.7	81.5 ± 33.3	ND	ND	ND
CW Tau	12-08-2018	-12.2 ± 17.3	105.9 ± 39.5	8.9 ± 2.6	ND	ND	ND
		-117.0 ± 13.2	62.3 ± 45.8	7.1 ± 2.8	ND	ND	ND
DD Tau	12-19-2015	-	-	-	ND	ND	ND
DF Tau	12-08-2018	128.1 ± 5.2	54.1 ± 13.5	4.8 ± 1.0	ND	ND	ND
		32.9 ± 13.2	70.6 ± 20.3	3.9 ± 1.0	ND	ND	ND
		-54.8 ± 3.0	64.7 ± 5.5	10.6 ± 1.0	ND	ND	ND
		-107.1 ± 1.5	42.3 ± 6.7	12.5 ± 1.2	ND	ND	ND
DG Tau	12-19-2015	-	-	-	-32.5 ± 5.3	11.9 ± 9.2	4.5 ± 2.6
	10-29-2017	-22.5 ± 0.6	21.0 ± 0.9	104.0 ± 3.5	-23.2 ± 8.5	15.5 ± 13.2	1.7 ± 1.4
		-61.0 ± 0.8	77.7 ± 0.9	135.5 ± 2.2	ND	ND	ND
		-129.3 ± 1.1	52.0 ± 0.6	254.0 ± 1.7	ND	ND	ND
DH Tau	11-02-2019	ND	ND	ND	ND	ND	ND
DK Tau	12-08-2018	-79.1 ± 20.1	122.4 ± 51.6	7.0 ± 2.4	ND	ND	ND
DL Tau	12-20-2015	-	-	-	-12.7 ± 7.6	7.1 ± 7.5	2.1 ± 2.0
	10-29-2017	20.0 ± 21.7	38.5 ± 36.6	1.5 ± 0.9	-17.9 ± 5.2	10.3 ± 7.6	1.8 ± 1.2
		-18.8 ± 6.9	13.4 ± 21.0	3.1 ± 1.3	ND	ND	ND
		-68.0 ± 13.7	94.1 ± 31.6	2.7 ± 0.6	ND	ND	ND
		-164.5 ± 11.9	85.9 ± 19.2	3.4 ± 8.7	ND	ND	ND
DN Tau	11-01-2019	ND	ND	ND	ND	ND	ND
DO Tau	12-19-2015	-	-	-	-13.4 ± 2.8	7.1 ± 2.5	1.9 ± 0.7
	11-13-2017	-89.0 ± 1.8	56.4 ± 2.4	41.0 ± 1.4	-28.3 ± 4.6	5.7 ± 4.8	2.2 ± 1.8
		-102.3 ± 0.7	24.0 ± 1.1	59.3 ± 2.1	ND	ND	ND
	01-26-2020	-74.0 ± 3.9	69.4 ± 14.2	26.0 ± 2.9	ND	ND	ND
		-106.6 ± 0.3	25.3 ± 2.6	84.2 ± 2.6	ND	ND	ND
DQ Tau	11-02-2019	-18.9 ± 2.0	63.5 ± 5.7	13.7 ± 1.0	ND	ND	ND
		-78.1 ± 7.4	31.0 ± 16.1	4.1 ± 1.3	ND	ND	ND
DR Tau	01-25-2020	-19.5 ± 9.6	70.6 ± 24.7	3.3 ± 0.6	ND	ND	ND
DS Tau	11-01-2019	ND	ND	ND	ND	ND	ND
FT Tau	01-25-2020	-105.0 ± 13.0	94.2 ± 20.7	1.0 ± 0.2	ND	ND	ND
GG Tau	12-09-2018	-20.0 ± 8.6	13.9 ± 22.4	2.4 ± 2.3	-14.8 ± 7.6	5.3 ± 7.1	1.2 ± 0.9
GH Tau	01-25-2020	-69.0 ± 12.6	47.0 ± 32.7	1.5 ± 0.6	ND	ND	ND
GI Tau	01-26-2020	42.0 ± 5.9	35.2 ± 13.6	2.0 ± 0.5	ND	ND	ND
		-43.0 ± 7.3	62.3 ± 14.3	2.0 ± 0.4	ND	ND	ND
GK Tau	11-02-2019	ND	ND	ND	ND	ND	ND
GM Aur	12-09-2018	ND	ND	ND	-15.5 ± 3.8	4.2 ± 2.6	0.4 ± 0.3
HL Tau	11-24-2016	-	-	-	ND	ND	ND
HN Tau	12-19-2015	-	-	-	ND	ND	ND
	10-29-2017	-	-	-	ND	ND	ND
HQ Tau	11-01-2019	ND	ND	ND	ND	ND	ND
IP Tau	12-09-2018	ND	ND	ND	ND	ND	ND
IQ Tau	11-02-2019	-30.0 ± 1.2	34.0 ± 3.0	69.5 ± 1.2	-11.4 ± 2.7	11.2 ± 2.5	2.4 ± 0.1
MWC 480	11-01-2019	ND	ND	ND	ND	ND	ND
RW Aur A	11-13-2017	111.6 ± 7.9	73.9 ± 15.5	75.5 ± 13.7	ND	ND	ND
		-90.9 ± 8.9	211.3 ± 19.7	108.0 ± 9.8	-20.8 ± 8.0	15.2 ± 5.6	3.6 ± 2.0
		-172.1 ± 9.9	73.8 ± 22.5	65.0 ± 16.3	-24.0 ± 13.0	179.7 ± 14.9	3.8 ± 0.5
RY Tau	11-13-2017	-56.9 ± 14.1	56.9 ± 15.7	25.2 ± 7.1	ND	ND	ND
UX Tau	01-26-2020	23.5 ± 5.7	61.2 ± 20.3	8.8 ± 1.9	ND	ND	ND
UY Aur	12-08-2018	-20.5 ± 7.9	23.2 ± 12.3	8.4 ± 4.4	ND	ND	ND
		-30.0 ± 19.8	164.8 ± 64.2	9.5 ± 2.0	ND	ND	ND
UZ Tau E	12-09-2018	-72.0 ± 1.5	63.5 ± 8.1	46.0 ± 6.0	ND	ND	ND
V409 Tau	01-26-2020	-50.0 ± 3.8	68.2 ± 10.9	2.3 ± 0.3	ND	ND	ND
		-123.1 ± 6.5	44.7 ± 21.0	0.8 ± 0.2	ND	ND	ND
V836 Tau	11-02-2019	ND	ND	ND	ND	ND	ND
XZ Tau	03-14-2017	-	-	-	ND	ND	ND

Notes. ND: profile not detected, “-”: spectrum not acquired.