

Table 3. H<sub>2</sub> Transitions and their associated photon energies ( $E_p$ 's) and relative spectral intensities ( $I$ 's) associated with Uranian satellite orbital radii ( $R''_{ui}$ ,  $R'_{ui}$  and  $R_{ui}$ ).

$i$	H <sub>2</sub> Transition <sup>a</sup>	$E_p(\text{cm}^{-1})^a$	$I^a$	$E_p$ 's for Fig 5	Uranian Satellite	$(R''_{ui}, R'_{ui} \text{ or } R_{ui})^b$
11	(3,2) S(5)	4841	0.11			
			->	<b>4826<sup>c</sup></b>	Ring 6	1.637
12	(2,1) S(3)	4823	0.56			
13	(1,0) S(1)	4713	1.6			
			->	<b>4712<sup>c</sup></b>	Ring 5	1.652
14	(3,2) S(4)	4699	0.09			
15	(2,1) S(2)	4642	0.44	4642	Ring 4	1.666
15	(2,1) S(2)	4642	0.44	4642	Ring $\alpha$	1.750
14	(3,2) S(4)	4699	0.09			
			->	<b>4712<sup>c</sup></b>	Ring $\beta$	1.786
13	(1,0) S(1)	4713	1.6			
12	(2,1) S(3)	4823	0.56			
			->	<b>4826<sup>c</sup></b>	Ring $\eta$	1.834
11	(3,2) S(5)	4841	0.11			
10	(1,0) S(2)	4917	0.8	4917	Ring $\gamma$	1.863
9	(2,1) S(4)	4990	0.19	4990	Ring $\delta$	1.900
8	(9,7) S(0) <sup>d</sup>	5032	0.06			
7	(1,0) S(3)	5108	1.07	5108	Cordelia	1.948
6	(2,1) S(5)	5142	0.25			
			->	<b>5144<sup>c</sup></b>	Ring $\lambda$	1.957
5	(9,7) S(1)	5147	0.11			
4	(2,1) S(6)	5278	0.08			
			->	<b>5285<sup>c</sup></b>	Ring $\epsilon$	2.006
3	(1,0) S(4)	5286	0.37			
2	(9,7) S(3) <sup>d</sup>	5325	0.05			
1	(2,1) S(7)	5397	0.12	5397	Ophelia	2.105
1	(2,1) S(7)	5397	0.12	5397	Bianca	2.316
2	(9,7) S(3) <sup>d</sup>	5325	0.05			
3	(1,0) S(4)	5286	0.37			
			->	<b>5285<sup>c</sup></b>	Cressida	2.418
4	(2,1) S(6)	5278	0.08			
5	(9,7) S(1)	5147	0.11			
			->	<b>5144<sup>c</sup></b>	Desdemona	2.453
6	(2,1) S(5)	5142	0.25			
7	(1,0) S(3)	5108	1.07	5108	Juliet	2.520
8	(9,7) S(0) <sup>d</sup>	5032	0.06			
9	(2,1) S(4)	4990	0.19	4990	Portia	2.586
10	(1,0) S(2)	4917	0.8	4917	Rosalind	2.735
11	(3,2) S(5)	4841	0.11	4841	Belinda	2.946
12	(2,1) S(3)	4823	0.56	4823	Perdita	2.990
13	(1,0) S(1)	4713	1.6			
			->	<b>4712<sup>c</sup></b>	Puck	3.365
14	(3,2) S(4)	4699	0.09			
15	(2,1) S(2)	4642	0.44	4642	Mab	3.824
16	(3,2) S(3)	4543	0.28	4543	Miranda	5.082
17	(1,0) S(0)	4498	0.73	4498	Ariel	7.469
18	(2,1) S(1)	4449	0.89	4449	Umbriel	10.407
19	(3,2) S(2)	4372	0.23	4372	Titania	17.070
20	(4,3) S(3)	4265	0.13	4265	Oberon	22.830

<sup>a</sup>Black van Dishoeck (1987)

<sup>b</sup>Data from NASA (2021)

$R''_{ui}$  refers to orbital radii from Ring 6 to Ring 4.

$R'_{ui}$  refers to orbital radii from Ring  $\alpha$  to Ophelia.

$R_{ui}$  refers to orbital radii from Bianca to Oberon.

<sup>c</sup>A bolded  $E_p$  is a weighted average of the  $E_p$ 's on the previous and following lines. The weighting factors are the corresponding  $I$ 's.

<sup>d</sup>It is not possible to associate this low intensity spectral line with any satellite.

