

Calcul des transitions d'énergie (du niveau atomique N2 au niveau N1) et des longueurs d'onde d'émission pour un atome hydrogénéoïde

Valeur des constantes utilisées :

Constante de Planck
 $h = 6.62617992 \cdot 10^{-34} \text{ J.s}$

Célérité de la lumière
 $c = 2.99792512 \cdot 10^8 \text{ m.s}^{-1}$

Conversion Joule -> eV
 $1 \text{ eV} = 1.5999999999999999 \cdot 10^{-19} \text{ J}$

Valeur de Z = 1	Valeur de Z = 2
<p>TRANSITION VERS LE NIVEAU N1 = 1 (Série de Lyman)</p> <p>N1= 1 N2= 2 ΔE (eV)= 10.200 λ (nm)= 121.721 N1= 1 N2= 3 ΔE (eV)= 12.089 λ (nm)= 102.702 N1= 1 N2= 4 ΔE (eV)= 12.750 λ (nm)= 97.376 N1= 1 N2= 5 ΔE (eV)= 13.056 λ (nm)= 95.094 N1= 1 N2= 6 ΔE (eV)= 13.222 λ (nm)= 93.899 N1= 1 N2= 7 ΔE (eV)= 13.322 λ (nm)= 93.192</p> <p>TRANSITION VERS LE NIVEAU N1 = 2 (Série de Balmer)</p> <p>N1= 2 N2= 3 ΔE (eV)= 1.889 λ (nm)= 657.291 N1= 2 N2= 4 ΔE (eV)= 2.550 λ (nm)= 486.882 N1= 2 N2= 5 ΔE (eV)= 2.856 λ (nm)= 434.716 N1= 2 N2= 6 ΔE (eV)= 3.022 λ (nm)= 410.807 N1= 2 N2= 7 ΔE (eV)= 3.122 λ (nm)= 397.620</p> <p>TRANSITION VERS LE NIVEAU N1 = 3 (Série de Paschen)</p> <p>N1= 3 N2= 4 ΔE (eV)= 0.661 λ (nm)= 1877.974 N1= 3 N2= 5 ΔE (eV)= 0.967 λ (nm)= 1283.771 N1= 3 N2= 6 ΔE (eV)= 1.133 λ (nm)= 1095.485 N1= 3 N2= 7 ΔE (eV)= 1.234 λ (nm)= 1006.477</p> <p>TRANSITION VERS LE NIVEAU N1 = 4 (Série de Brackett)</p> <p>N1= 4 N2= 5 ΔE (eV)= 0.306 λ (nm)= 4057.351 N1= 4 N2= 6 ΔE (eV)= 0.472 λ (nm)= 2629.164 N1= 4 N2= 7 ΔE (eV)= 0.572 λ (nm)= 2168.839</p> <p>TRANSITION VERS LE NIVEAU N1 = 5 (Série de Pfund)</p> <p>N1= 5 N2= 6 ΔE (eV)= 0.166 λ (nm)= 7469.215 N1= 5 N2= 7 ΔE (eV)= 0.266 λ (nm)= 4659.614</p> <p>TRANSITION VERS LE NIVEAU N1 = 6</p> <p>N1= 6 N2= 7 ΔE (eV)= 0.100 λ (nm)= 12387.405</p>	<p>TRANSITION VERS LE NIVEAU N1 = 1</p> <p>N1= 1 N2= 2 ΔE (eV)= 40.800 λ (nm)= 30.430 N1= 1 N2= 3 ΔE (eV)= 48.356 λ (nm)= 25.675 N1= 1 N2= 4 ΔE (eV)= 51.000 λ (nm)= 24.344 N1= 1 N2= 5 ΔE (eV)= 52.224 λ (nm)= 23.774 N1= 1 N2= 6 ΔE (eV)= 52.889 λ (nm)= 23.475 N1= 1 N2= 7 ΔE (eV)= 53.290 λ (nm)= 23.298</p> <p>TRANSITION VERS LE NIVEAU N1 = 2</p> <p>N1= 2 N2= 3 ΔE (eV)= 7.556 λ (nm)= 164.323 N1= 2 N2= 4 ΔE (eV)= 10.200 λ (nm)= 121.721 N1= 2 N2= 5 ΔE (eV)= 11.424 λ (nm)= 108.679 N1= 2 N2= 6 ΔE (eV)= 12.089 λ (nm)= 102.702 N1= 2 N2= 7 ΔE (eV)= 12.490 λ (nm)= 99.405</p> <p>TRANSITION VERS LE NIVEAU N1 = 3</p> <p>N1= 3 N2= 4 ΔE (eV)= 2.644 λ (nm)= 469.493 N1= 3 N2= 5 ΔE (eV)= 3.868 λ (nm)= 320.943 N1= 3 N2= 6 ΔE (eV)= 4.533 λ (nm)= 273.871 N1= 3 N2= 7 ΔE (eV)= 4.934 λ (nm)= 251.619</p> <p>TRANSITION VERS LE NIVEAU N1 = 4</p> <p>N1= 4 N2= 5 ΔE (eV)= 1.224 λ (nm)= 1014.338 N1= 4 N2= 6 ΔE (eV)= 1.889 λ (nm)= 657.291 N1= 4 N2= 7 ΔE (eV)= 2.290 λ (nm)= 542.210</p> <p>TRANSITION VERS LE NIVEAU N1 = 5</p> <p>N1= 5 N2= 6 ΔE (eV)= 0.665 λ (nm)= 1867.304 N1= 5 N2= 7 ΔE (eV)= 1.066 λ (nm)= 1164.904</p> <p>TRANSITION VERS LE NIVEAU N1 = 6</p> <p>N1= 6 N2= 7 ΔE (eV)= 0.401 λ (nm)= 3096.851</p>
<p>Valeur de Z = 3</p> <p>TRANSITION VERS LE NIVEAU N1 = 1</p> <p>N1= 1 N2= 2 ΔE (eV)= 91.800 λ (nm)= 13.525 N1= 1 N2= 3 ΔE (eV)= 108.800 λ (nm)= 11.411 N1= 1 N2= 4 ΔE (eV)= 114.750 λ (nm)= 10.820 N1= 1 N2= 5 ΔE (eV)= 117.504 λ (nm)= 10.566 N1= 1 N2= 6 ΔE (eV)= 119.000 λ (nm)= 10.433 N1= 1 N2= 7 ΔE (eV)= 119.902 λ (nm)= 10.355</p> <p>TRANSITION VERS LE NIVEAU N1 = 2</p> <p>N1= 2 N2= 3 ΔE (eV)= 17.000 λ (nm)= 73.032 N1= 2 N2= 4 ΔE (eV)= 22.950 λ (nm)= 54.098 N1= 2 N2= 5 ΔE (eV)= 25.704 λ (nm)= 48.302 N1= 2 N2= 6 ΔE (eV)= 27.200 λ (nm)= 45.645 N1= 2 N2= 7 ΔE (eV)= 28.102 λ (nm)= 44.180</p> <p>TRANSITION VERS LE NIVEAU N1 = 3</p> <p>N1= 3 N2= 4 ΔE (eV)= 5.950 λ (nm)= 208.664 N1= 3 N2= 5 ΔE (eV)= 8.704 λ (nm)= 142.641 N1= 3 N2= 6 ΔE (eV)= 10.200 λ (nm)= 121.721 N1= 3 N2= 7 ΔE (eV)= 11.102 λ (nm)= 111.831</p> <p>TRANSITION VERS LE NIVEAU N1 = 4</p> <p>N1= 4 N2= 5 ΔE (eV)= 2.754 λ (nm)= 450.817 N1= 4 N2= 6 ΔE (eV)= 4.250 λ (nm)= 292.129 N1= 4 N2= 7 ΔE (eV)= 5.152 λ (nm)= 240.982</p> <p>TRANSITION VERS LE NIVEAU N1 = 5</p> <p>N1= 5 N2= 6 ΔE (eV)= 1.496 λ (nm)= 829.913 N1= 5 N2= 7 ΔE (eV)= 2.398 λ (nm)= 517.735</p> <p>TRANSITION VERS LE NIVEAU N1 = 6</p> <p>N1= 6 N2= 7 ΔE (eV)= 0.902 λ (nm)= 1376.378</p>	<p>Valeur de Z = 4</p> <p>TRANSITION VERS LE NIVEAU N1 = 1</p> <p>N1= 1 N2= 2 ΔE (eV)= 163.200 λ (nm)= 7.608 N1= 1 N2= 3 ΔE (eV)= 193.422 λ (nm)= 6.419 N1= 1 N2= 4 ΔE (eV)= 204.000 λ (nm)= 6.086 N1= 1 N2= 5 ΔE (eV)= 208.896 λ (nm)= 5.943 N1= 1 N2= 6 ΔE (eV)= 211.556 λ (nm)= 5.869 N1= 1 N2= 7 ΔE (eV)= 213.159 λ (nm)= 5.825</p> <p>TRANSITION VERS LE NIVEAU N1 = 2</p> <p>N1= 2 N2= 3 ΔE (eV)= 30.222 λ (nm)= 41.081 N1= 2 N2= 4 ΔE (eV)= 40.800 λ (nm)= 30.430 N1= 2 N2= 5 ΔE (eV)= 45.696 λ (nm)= 27.170 N1= 2 N2= 6 ΔE (eV)= 48.356 λ (nm)= 25.675 N1= 2 N2= 7 ΔE (eV)= 49.959 λ (nm)= 24.851</p> <p>TRANSITION VERS LE NIVEAU N1 = 3</p> <p>N1= 3 N2= 4 ΔE (eV)= 10.578 λ (nm)= 117.373 N1= 3 N2= 5 ΔE (eV)= 15.474 λ (nm)= 80.236 N1= 3 N2= 6 ΔE (eV)= 18.133 λ (nm)= 68.468 N1= 3 N2= 7 ΔE (eV)= 19.737 λ (nm)= 62.905</p> <p>TRANSITION VERS LE NIVEAU N1 = 4</p> <p>N1= 4 N2= 5 ΔE (eV)= 4.896 λ (nm)= 253.584 N1= 4 N2= 6 ΔE (eV)= 7.556 λ (nm)= 164.323 N1= 4 N2= 7 ΔE (eV)= 9.159 λ (nm)= 135.552</p> <p>TRANSITION VERS LE NIVEAU N1 = 5</p> <p>N1= 5 N2= 6 ΔE (eV)= 2.660 λ (nm)= 466.826 N1= 5 N2= 7 ΔE (eV)= 4.263 λ (nm)= 291.226</p> <p>TRANSITION VERS LE NIVEAU N1 = 6</p> <p>N1= 6 N2= 7 ΔE (eV)= 1.604 λ (nm)= 774.213</p>

Valeur de Z = 5

TRANSITION VERS LE NIVEAU N1 = 1			
N1= 1	N2= 2	ΔE (eV)=	255.000 λ (nm)= 4.869
N1= 1	N2= 3	ΔE (eV)=	302.222 λ (nm)= 4.108
N1= 1	N2= 4	ΔE (eV)=	318.750 λ (nm)= 3.895
N1= 1	N2= 5	ΔE (eV)=	326.400 λ (nm)= 3.804
N1= 1	N2= 6	ΔE (eV)=	330.556 λ (nm)= 3.756
N1= 1	N2= 7	ΔE (eV)=	333.061 λ (nm)= 3.728
TRANSITION VERS LE NIVEAU N1 = 2			
N1= 2	N2= 3	ΔE (eV)=	47.222 λ (nm)= 26.292
N1= 2	N2= 4	ΔE (eV)=	63.750 λ (nm)= 19.475
N1= 2	N2= 5	ΔE (eV)=	71.400 λ (nm)= 17.389
N1= 2	N2= 6	ΔE (eV)=	75.556 λ (nm)= 16.432
N1= 2	N2= 7	ΔE (eV)=	78.061 λ (nm)= 15.905
TRANSITION VERS LE NIVEAU N1 = 3			
N1= 3	N2= 4	ΔE (eV)=	16.528 λ (nm)= 75.119
N1= 3	N2= 5	ΔE (eV)=	24.178 λ (nm)= 51.351
N1= 3	N2= 6	ΔE (eV)=	28.333 λ (nm)= 43.819
N1= 3	N2= 7	ΔE (eV)=	30.839 λ (nm)= 40.259
TRANSITION VERS LE NIVEAU N1 = 4			
N1= 4	N2= 5	ΔE (eV)=	7.650 λ (nm)= 162.294
N1= 4	N2= 6	ΔE (eV)=	11.806 λ (nm)= 105.167
N1= 4	N2= 7	ΔE (eV)=	14.311 λ (nm)= 86.754
TRANSITION VERS LE NIVEAU N1 = 5			
N1= 5	N2= 6	ΔE (eV)=	4.156 λ (nm)= 298.769
N1= 5	N2= 7	ΔE (eV)=	6.661 λ (nm)= 186.385
TRANSITION VERS LE NIVEAU N1 = 6			
N1= 6	N2= 7	ΔE (eV)=	2.506 λ (nm)= 495.496

Valeur de Z = 6

TRANSITION VERS LE NIVEAU N1 = 1			
N1= 1	N2= 2	ΔE (eV)=	367.200 λ (nm)= 3.381
N1= 1	N2= 3	ΔE (eV)=	435.200 λ (nm)= 2.853
N1= 1	N2= 4	ΔE (eV)=	459.000 λ (nm)= 2.705
N1= 1	N2= 5	ΔE (eV)=	470.016 λ (nm)= 2.642
N1= 1	N2= 6	ΔE (eV)=	476.000 λ (nm)= 2.608
N1= 1	N2= 7	ΔE (eV)=	479.608 λ (nm)= 2.589
TRANSITION VERS LE NIVEAU N1 = 2			
N1= 2	N2= 3	ΔE (eV)=	68.000 λ (nm)= 18.258
N1= 2	N2= 4	ΔE (eV)=	91.800 λ (nm)= 13.525
N1= 2	N2= 5	ΔE (eV)=	102.816 λ (nm)= 12.075
N1= 2	N2= 6	ΔE (eV)=	108.800 λ (nm)= 11.411
N1= 2	N2= 7	ΔE (eV)=	112.408 λ (nm)= 11.045
TRANSITION VERS LE NIVEAU N1 = 3			
N1= 3	N2= 4	ΔE (eV)=	23.800 λ (nm)= 52.166
N1= 3	N2= 5	ΔE (eV)=	34.816 λ (nm)= 35.660
N1= 3	N2= 6	ΔE (eV)=	40.800 λ (nm)= 30.430
N1= 3	N2= 7	ΔE (eV)=	44.408 λ (nm)= 27.958
TRANSITION VERS LE NIVEAU N1 = 4			
N1= 4	N2= 5	ΔE (eV)=	11.016 λ (nm)= 112.704
N1= 4	N2= 6	ΔE (eV)=	17.000 λ (nm)= 73.032
N1= 4	N2= 7	ΔE (eV)=	20.608 λ (nm)= 60.246
TRANSITION VERS LE NIVEAU N1 = 5			
N1= 5	N2= 6	ΔE (eV)=	5.984 λ (nm)= 207.478
N1= 5	N2= 7	ΔE (eV)=	9.592 λ (nm)= 129.434
TRANSITION VERS LE NIVEAU N1 = 6			
N1= 6	N2= 7	ΔE (eV)=	3.608 λ (nm)= 344.095

Valeur de Z = 7

TRANSITION VERS LE NIVEAU N1 = 1			
N1= 1	N2= 2	ΔE (eV)=	499.800 λ (nm)= 2.484
N1= 1	N2= 3	ΔE (eV)=	592.356 λ (nm)= 2.096
N1= 1	N2= 4	ΔE (eV)=	624.750 λ (nm)= 1.987
N1= 1	N2= 5	ΔE (eV)=	639.744 λ (nm)= 1.941
N1= 1	N2= 6	ΔE (eV)=	647.889 λ (nm)= 1.916
N1= 1	N2= 7	ΔE (eV)=	652.800 λ (nm)= 1.902
TRANSITION VERS LE NIVEAU N1 = 2			
N1= 2	N2= 3	ΔE (eV)=	92.556 λ (nm)= 13.414
N1= 2	N2= 4	ΔE (eV)=	124.950 λ (nm)= 9.936
N1= 2	N2= 5	ΔE (eV)=	139.944 λ (nm)= 8.872
N1= 2	N2= 6	ΔE (eV)=	148.089 λ (nm)= 8.384
N1= 2	N2= 7	ΔE (eV)=	153.000 λ (nm)= 8.115
TRANSITION VERS LE NIVEAU N1 = 3			
N1= 3	N2= 4	ΔE (eV)=	32.394 λ (nm)= 38.326
N1= 3	N2= 5	ΔE (eV)=	47.388 λ (nm)= 26.199
N1= 3	N2= 6	ΔE (eV)=	55.533 λ (nm)= 22.357
N1= 3	N2= 7	ΔE (eV)=	60.444 λ (nm)= 20.540
TRANSITION VERS LE NIVEAU N1 = 4			
N1= 4	N2= 5	ΔE (eV)=	14.994 λ (nm)= 82.803
N1= 4	N2= 6	ΔE (eV)=	23.139 λ (nm)= 53.656
N1= 4	N2= 7	ΔE (eV)=	28.050 λ (nm)= 44.262
TRANSITION VERS LE NIVEAU N1 = 5			
N1= 5	N2= 6	ΔE (eV)=	8.145 λ (nm)= 152.433
N1= 5	N2= 7	ΔE (eV)=	13.056 λ (nm)= 95.094
TRANSITION VERS LE NIVEAU N1 = 6			
N1= 6	N2= 7	ΔE (eV)=	4.911 λ (nm)= 252.804