
Quantum Mechanics

Physics 237

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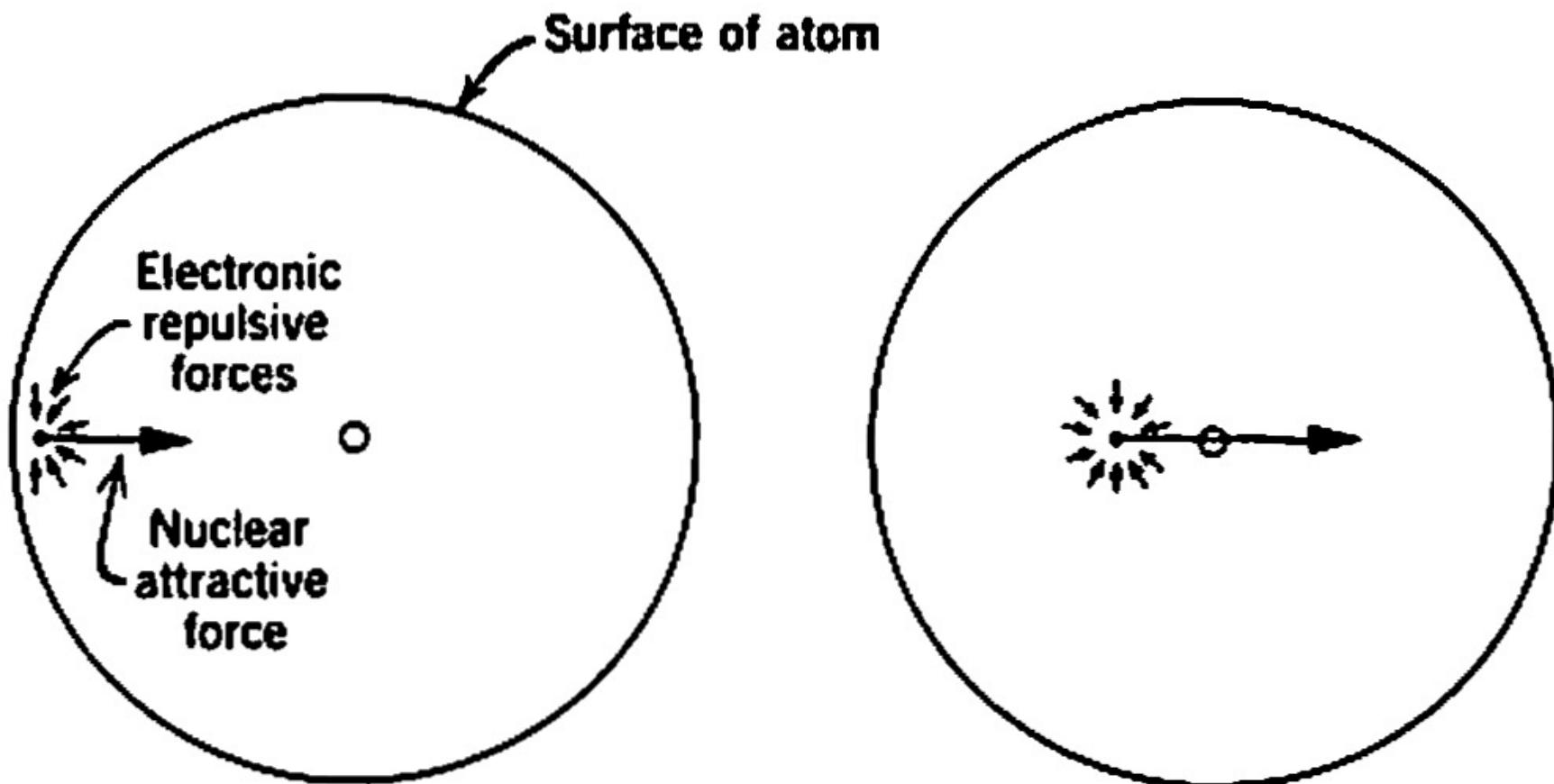
Annoucements

- Reminder: midterm exam # 2 on Tuesday March 22, 2022.
- Resources to help you prepare for the exam:
 - Review: Friday March 18, 3.40 pm – 5.40 pm, B&L 106
 - Office hours: Saturday 4 pm – 6 pm, POA (Porcelli) and Monday 11 am – 1 pm, B&L 203A (Wolfs)
 - QA session: Monday 4.50 pm – 6.15 pm, Hylan 305
- There will be no office hours and workshops on March 23 and March 24, 2022.

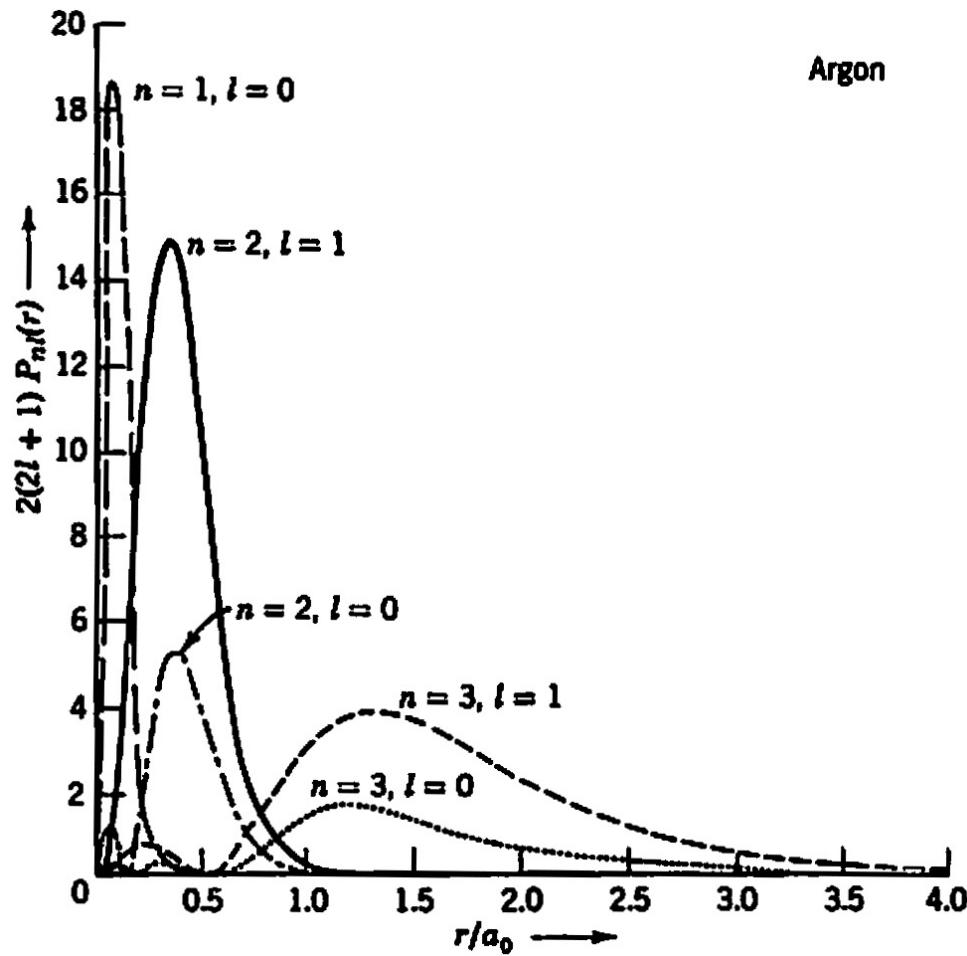
Tulips in the Netherlands.



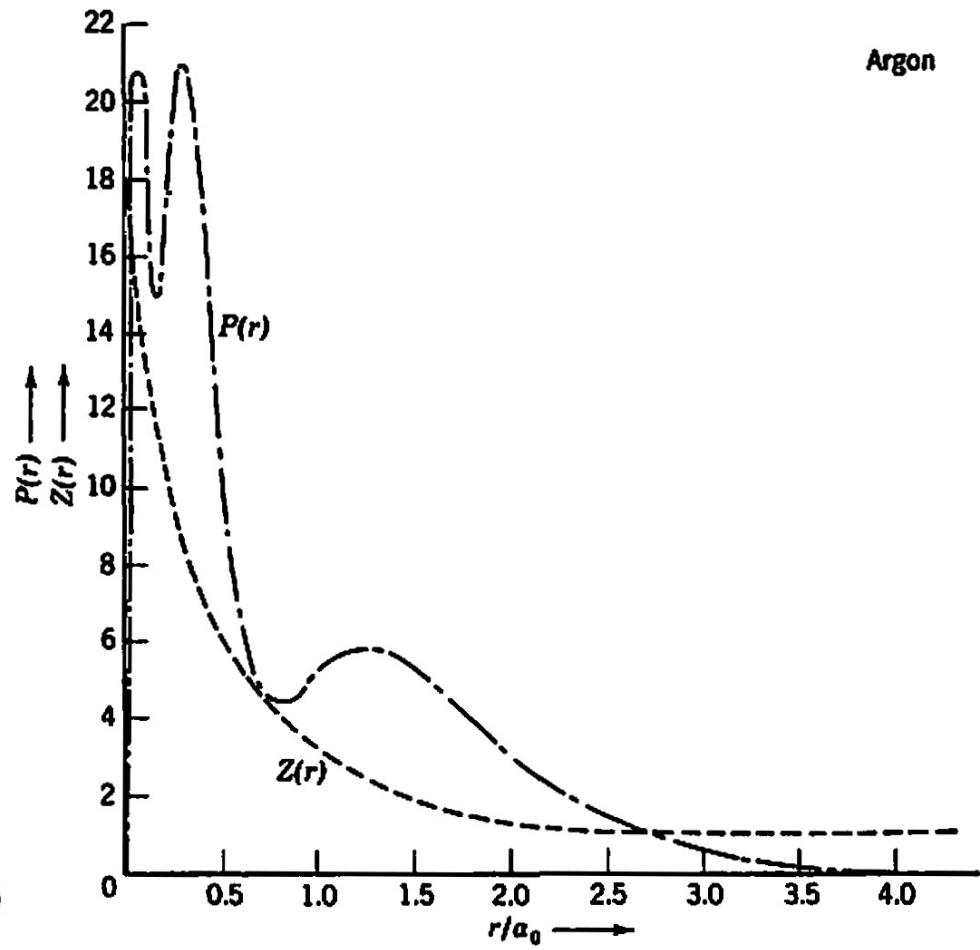
Forces on the electrons.



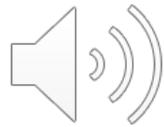
Results of Hartree Calculations.



Argon

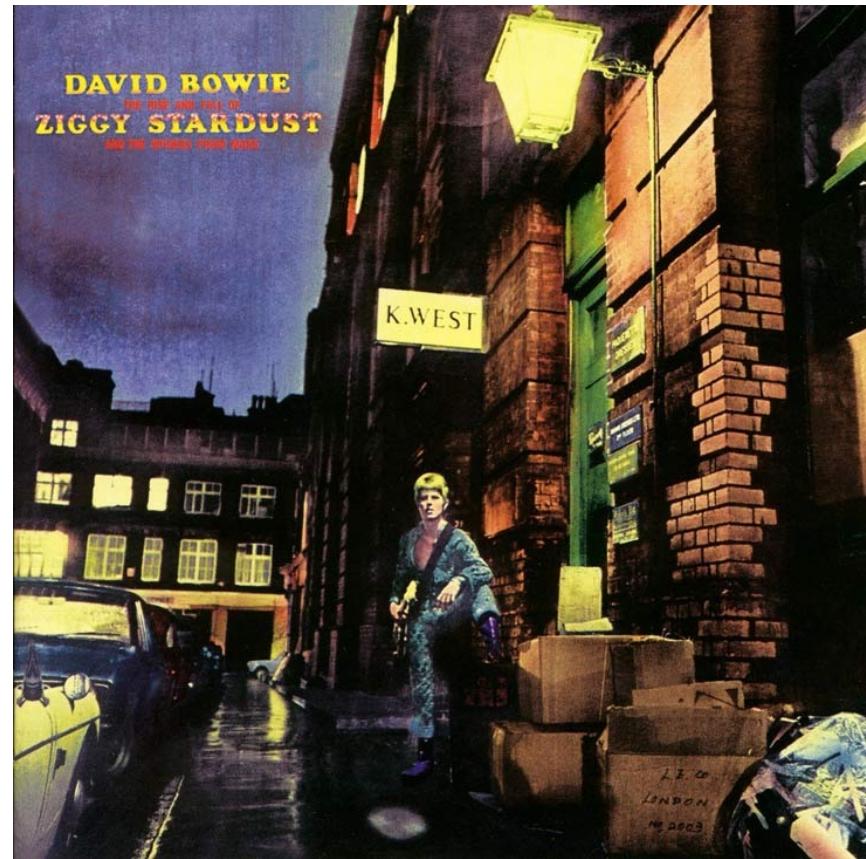


Argon



3 Minute 24 Second Intermission.

- Since paying attention for 1 hour and 15 minutes is hard when the topic is physics, let's take a 3 minute 24 second intermission.
- You can:
 - Stretch out.
 - Talk to your neighbors.
 - Ask me a quick question.
 - Enjoy the fantastic music.

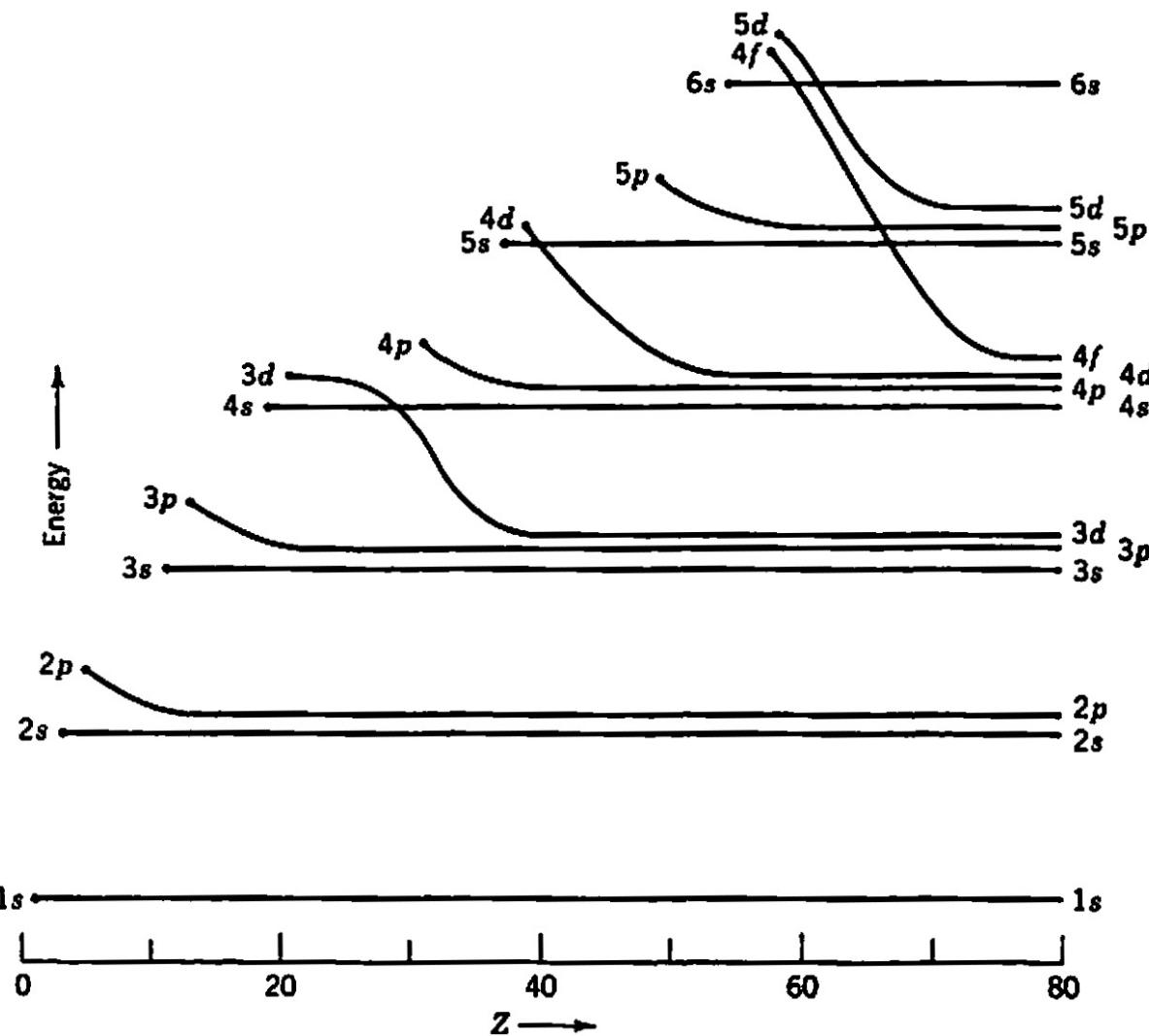


The periodic table.

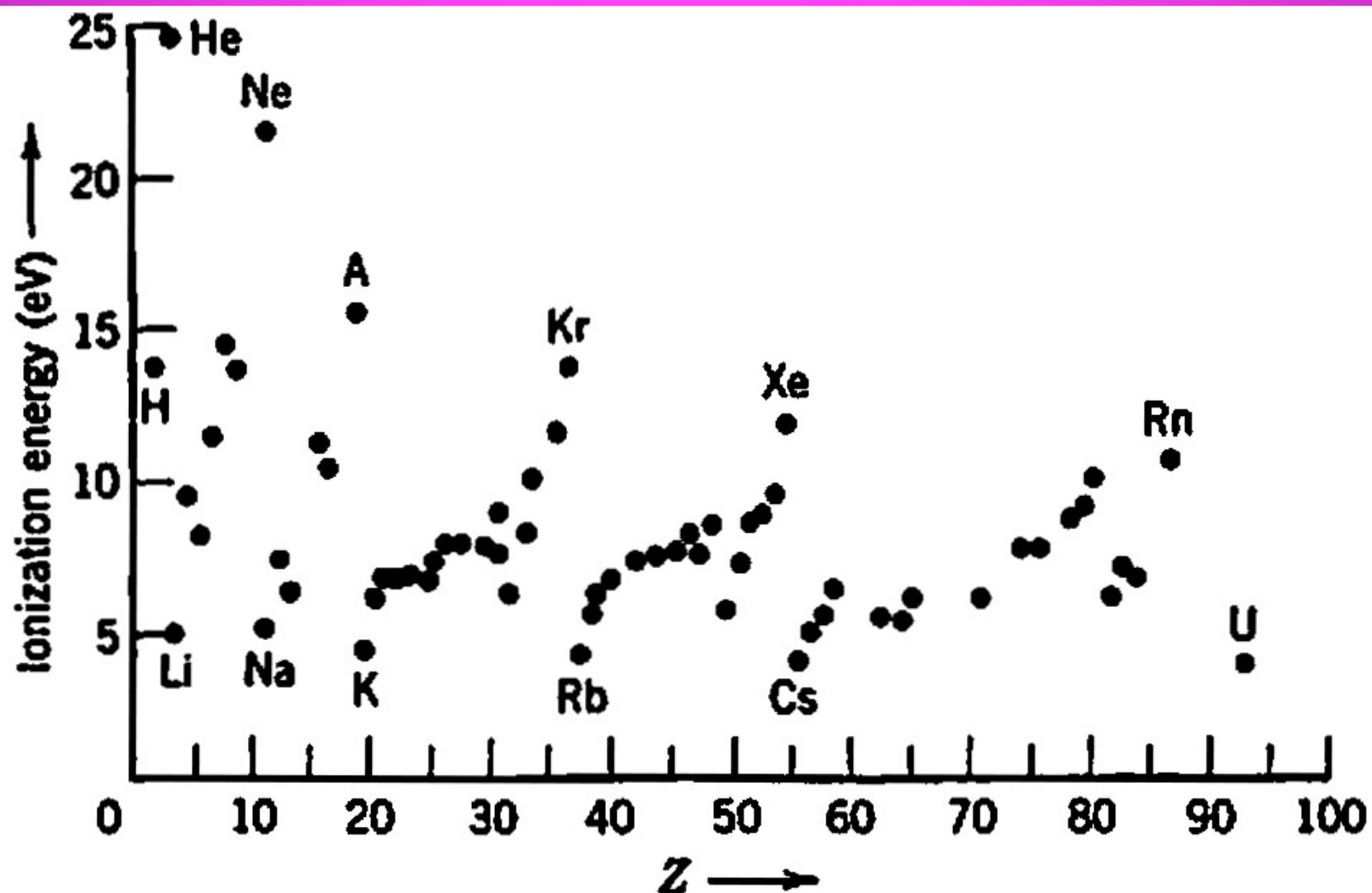
1 1s H													2 He															
3 2s Li	4 Be																											
11 3s Na	12 Mg																											
19 4s K	20 Ca																											
37 5s Rb	38 Sr																											
55 6s Cs	56 Ba																											
87 7s Fr	88 Ra																											
s ¹	s ²	d ¹	d ²	d ³	d ⁴	d ⁵	d ⁶	d ⁷	d ⁸	d ⁹	d ¹⁰	p ¹	p ²	p ³	p ⁴	p ⁵	p ⁶											
3d	21 Sc	22 Ti	23 V	24 Cr 4s ¹ 3d ⁵	25 Mn	26 Fe	27 Co	28 Ni	29 Cu 4s ¹ 3d ¹⁰	30 Zn																		
4d	39 Y	40 Zr	41 Nb 5s ¹ 4d ⁴	42 Mo	43 Tc	44 Ru 5s ¹ 4d ⁷	45 Rh 5s ¹ 4d ⁸	46 Pd 5s ⁰ 4d ¹⁰	47 Ag 5s ¹ 4d ¹⁰	48 Cd	5p	5	6	7	8	9	10											
5d	57 La Lanthanides	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt 6s ¹ 5d ⁹	79 Au 6s ¹ 5d ¹⁰	80 Hg	3p	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar											
6d	89 Ac Actinides										4p	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr											
Lanthanides	58 Ce 5d ⁰ 4f ²	59 Pr 5d ⁰ 4f ³	60 Nd 5d ⁰ 4f ⁴	61 Pm 5d ⁰ 4f ⁵	62 Sm 5d ⁰ 4f ⁶	63 Eu 5d ⁰ 4f ⁷	64 Gd 5d ¹ 4f ⁷	65 Tb 5d ⁰ 4f ⁹	66 Dy 5d ⁰ 4f ¹⁰	67 Ho 5d ⁰ 4f ¹¹	68 Er 5d ⁰ 4f ¹²	69 Tm 5d ⁰ 4f ¹³	70 Yb 5d ⁰ 4f ¹⁴	71 Lu 5d ¹ 4f ¹⁴														
Actinides	90 Th 6d ² 5f ⁰	91 Pa 6d ¹ 5f ²	92 U 6d ¹ 5f ³	93 Np 6d ¹ 5f ⁴	94 Pu 6d ¹ 5f ⁵	95 Am 6d ¹ 5f ⁶	96 Cm 6d ¹ 5f ⁷	97 Bk 6d ¹ 5f ⁸	98 Cf 6d ⁰ 5f ¹⁰	99 Es 6d ⁰ 5f ¹¹	100 Fm 6d ⁰ 5f ¹²	101 Md 6d ⁰ 5f ¹³	102 No 6d ⁰ 5f ¹⁴	103 Lw 6d ¹ 5f ¹⁴	f ¹	f ²	f ³	f ⁴	f ⁵	f ⁶	f ⁷	f ⁸	f ⁹	f ¹⁰	f ¹¹	f ¹²	f ¹³	f ¹⁴

Figure 9-13 The periodic table of the elements, showing the electron configuration for each element.

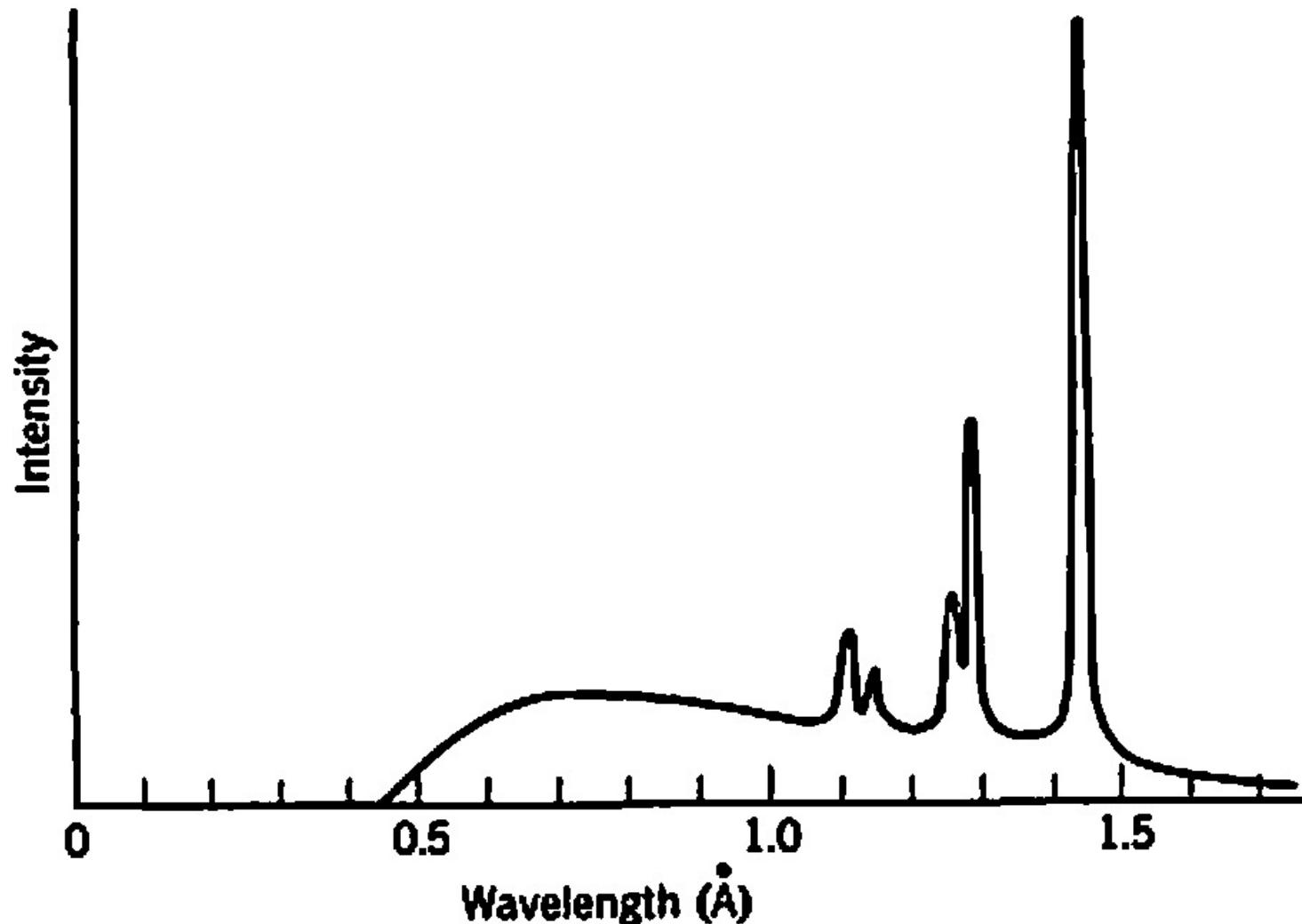
Energy ordering.



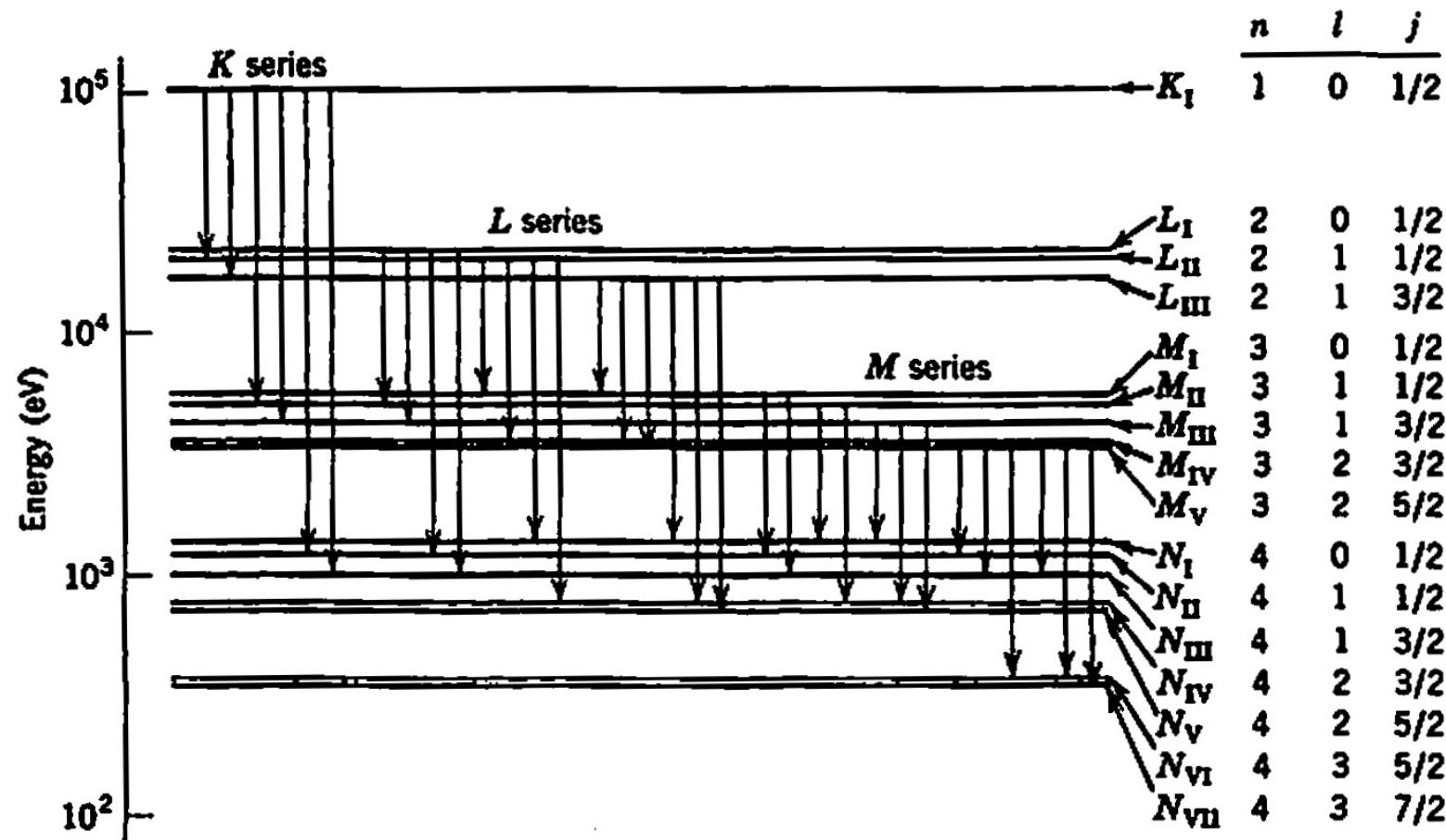
Ionization energy.



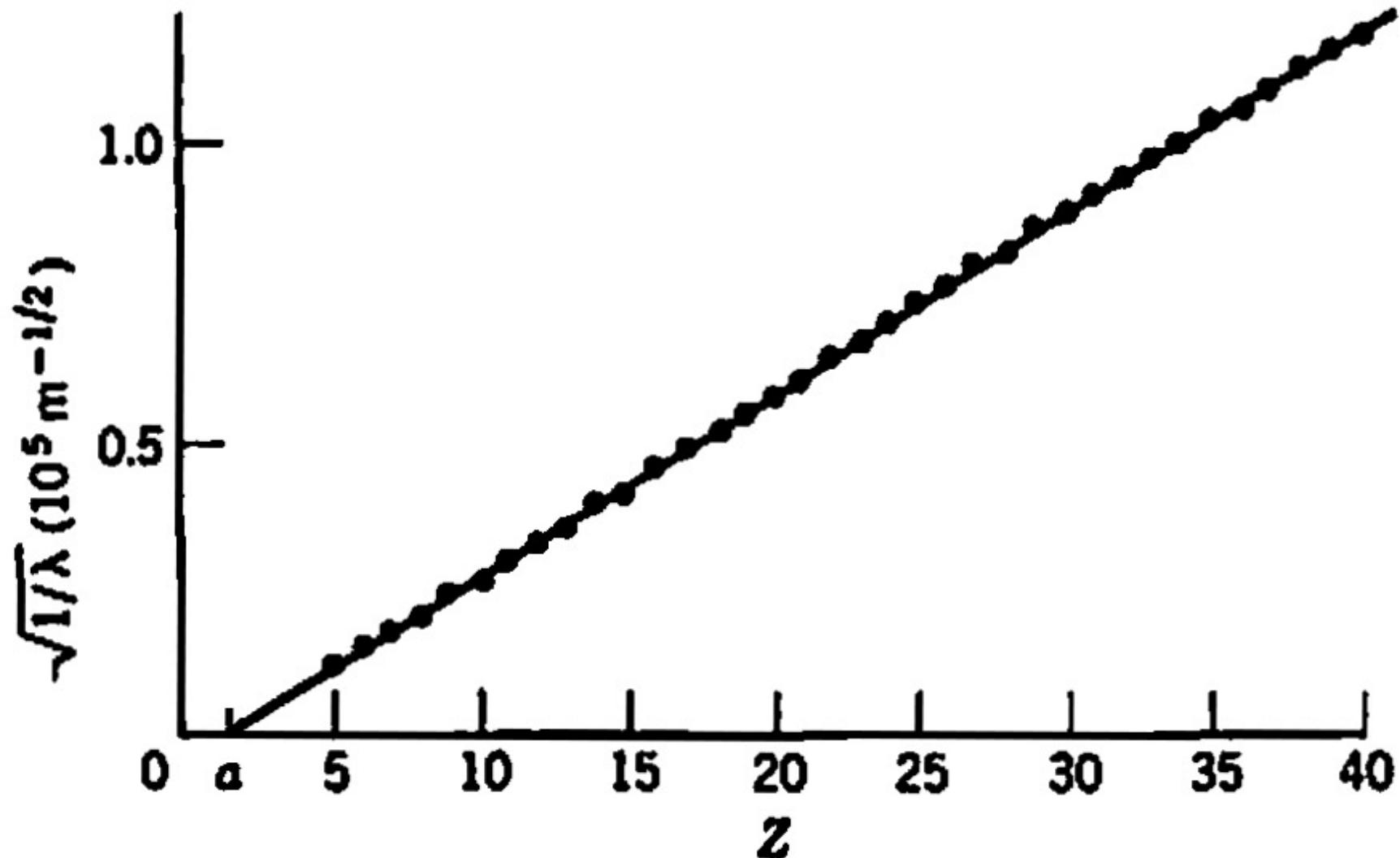
X-rays - provide detailed level information.



Energy levels of the hole and the selection rules.



Wavelength dependence.
Note: no sharp jumps!





ENOUGH FOR TODAY?