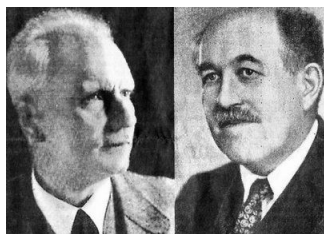


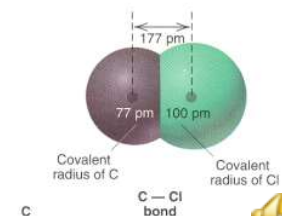
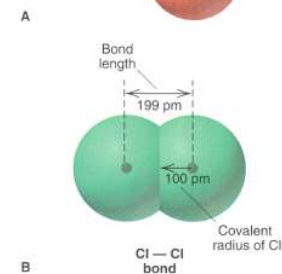
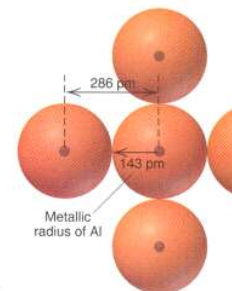
"s" block										"p" block						1s ²
1s ¹	2s ¹ 2s ²												2p ¹ 2p ²		2p ³ 2p ⁴	2p ⁵ 2p ⁶
3s ¹ 3s ²	"d" block										3p ¹ 3p ²		3p ³ 3p ⁴	3p ⁵ 3p ⁶		
4s ¹ 4s ²	3d ¹ 3d ²	3d ³ 3d ⁴	3d ⁵ 3d ⁶	3d ⁷ 3d ⁸	3d ⁹ 3d ¹⁰	4p ¹ 4p ²	4p ³ 4p ⁴	4p ⁵ 4p ⁶								
5s ¹ 5s ²	4d ¹ 4d ²	4d ³ 4d ⁴	4d ⁵ 4d ⁶	4d ⁷ 4d ⁸	4d ⁹ 4d ¹⁰	5p ¹ 5p ²	5p ³ 5p ⁴	5p ⁵ 5p ⁶								
6s ¹ 6s ²	5d ¹ 5d ²	5d ³ 5d ⁴	5d ⁵ 5d ⁶	5d ⁷ 5d ⁸	5d ⁹ 5d ¹⁰	6p ¹ 6p ²	6p ³ 6p ⁴	6p ⁵ 6p ⁶								
7s ¹ 7s ²	6d ¹ 6d ²	6d ³ 6d ⁴	6d ⁵ 6d ⁶	6d ⁷												

Chapter 8

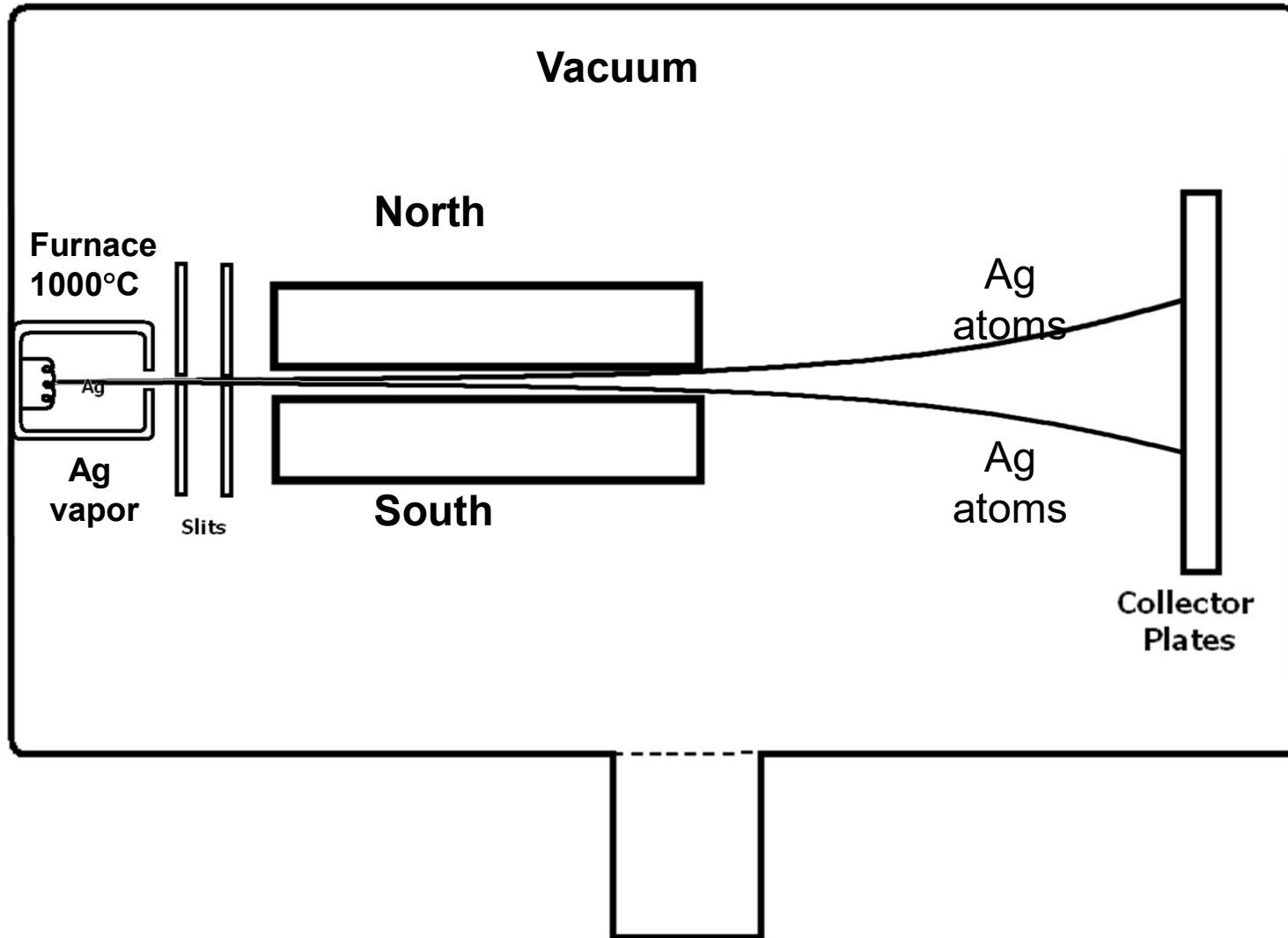


Electron Configuration and Chemical Periodicity

5	6	7	8	9	10
B	C	N	O	F	Ne
10.811	12.011	14.007	16.000	18.998	20.18

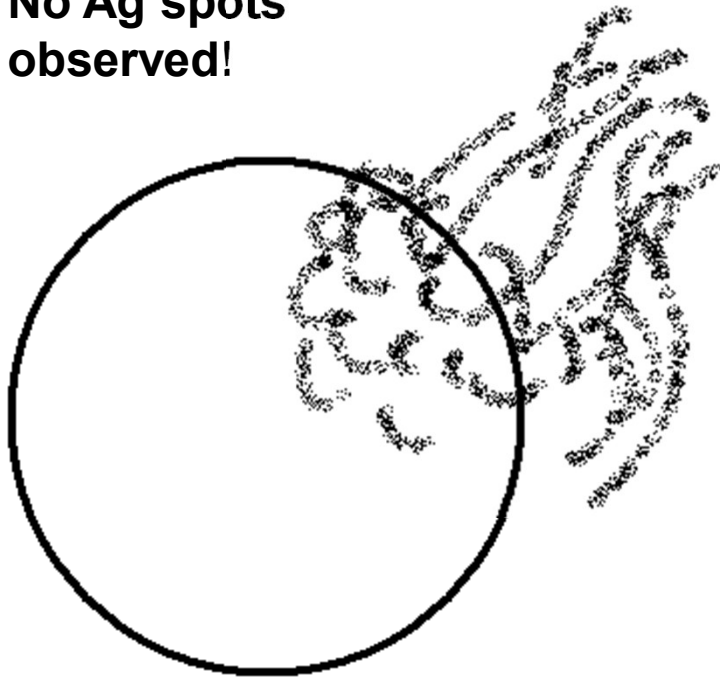


Stern-Gerlach Experiment

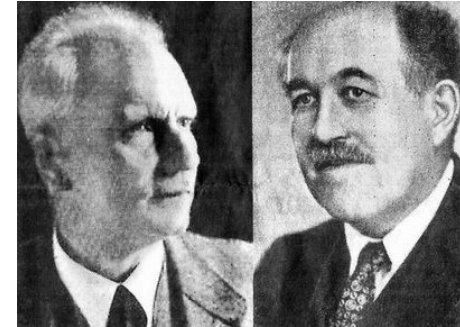


Stern-Gerlach Experiment

No Ag spots
observed!



Collector Plate



Walther Gerlach

Otto Stern

...as the story goes

...Stern smoked bad cigars

...Breathed on the collector plate (breath
contained sulfur!)

...Trace Ag converted to Ag_2S

...Making the spots visible!

...Conclusion: Two types of electrons!



Stern-Gerach Experiment

Electrons come in two different types
are identified by the electron spin quantum number

$$m_s$$

$$m_s = +\frac{1}{2} \text{ ("Spin up")}$$

$$m_s = -\frac{1}{2} \text{ ("Spin down")}$$



Pauli Exclusion Principle

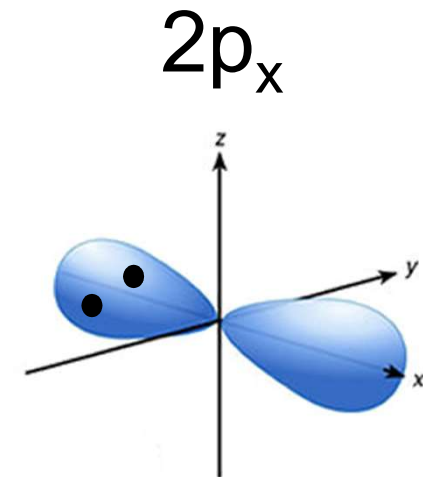
No two electrons can have the same set of four quantum numbers

$$(n \quad \ell \quad m_{\ell} \quad m_s)$$

in the same atom.

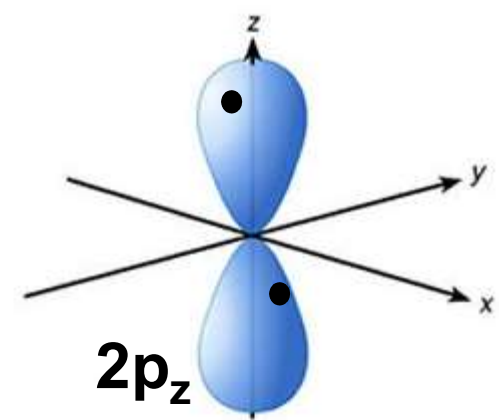
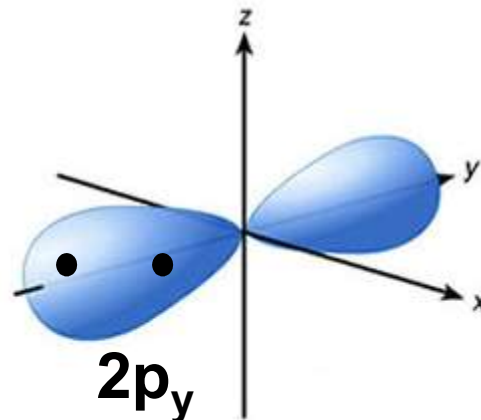
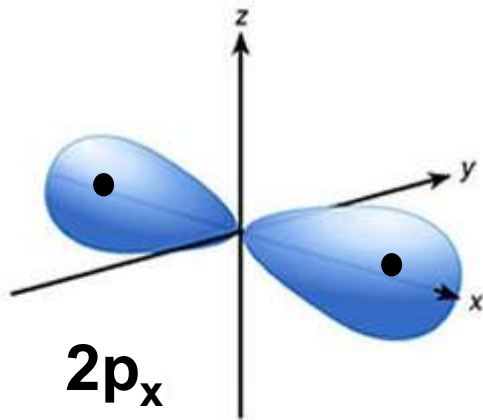
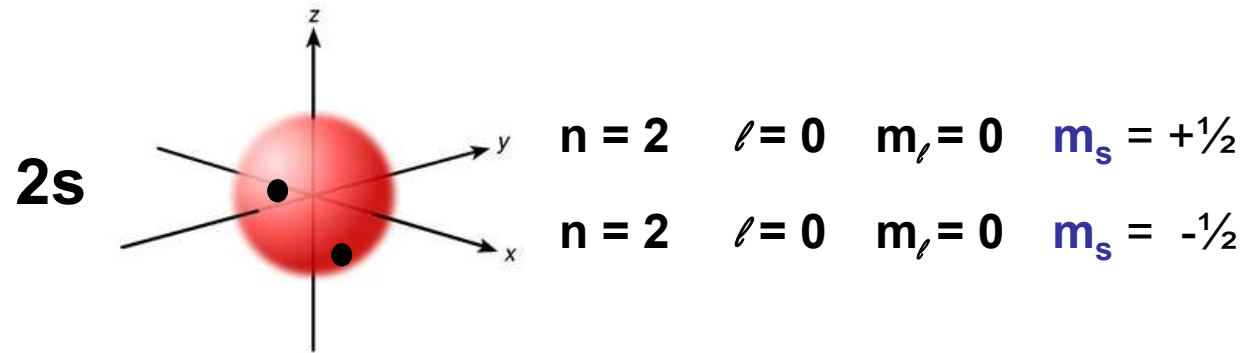
$$n = 2 \quad \ell = 1 \quad m_{\ell} = -1 \quad m_s = +\frac{1}{2}$$

$$n = 2 \quad \ell = 1 \quad m_{\ell} = -1 \quad m_s = -\frac{1}{2}$$



Maximum Capacity for 2p_x
is 2 electrons! 💡

Electron Count



$n = 2 \quad l = 1 \quad m_l = -1 \quad m_s = +\frac{1}{2}$

$n = 2 \quad l = 1 \quad m_l = -1 \quad m_s = -\frac{1}{2}$

$n = 2 \quad l = 1 \quad m_l = 0 \quad m_s = +\frac{1}{2}$

$n = 2 \quad l = 1 \quad m_l = 0 \quad m_s = -\frac{1}{2}$

$n = 2 \quad l = 1 \quad m_l = 1 \quad m_s = +\frac{1}{2}$

$n = 2 \quad l = 1 \quad m_l = 1 \quad m_s = -\frac{1}{2}$

$n = 2$: 2 electrons from $2s$ + 6 electrons from $2p$ = 8 electrons total

Total electrons = $2 \times n^2 = 2 \times 2^2 = 8$ electrons total!

