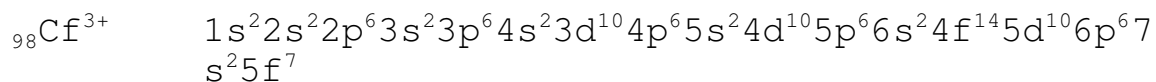
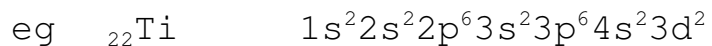


**Two types of quantum questions:**

- electron configuration question
- list the quantum number question

Electron configuration means make reference to all electrons in an atom



| element           | n | l | $m_l$ | $m_s$          | end of config. |
|-------------------|---|---|-------|----------------|----------------|
| S                 | 3 | 1 | 0     | $+\frac{1}{2}$ | $3p^4$         |
| Ta                | 5 | 2 | -1    | $-\frac{1}{2}$ | $5d^3$         |
| Pr                | 4 | 3 | -2    | $-\frac{1}{2}$ | $4f^3$         |
| Ge                | 4 | 1 | -1    | $+\frac{1}{2}$ | $4p^2$         |
| He                | 1 | 0 | 0     | $+\frac{1}{2}$ | $1s^2$         |
| Md                | 5 | 3 | 3     | $-\frac{1}{2}$ | $5f^{13}$      |
| Ca                | 4 | 0 | 0     | $+\frac{1}{2}$ | $4s^2$         |
| Ge                | 4 | 1 | -1    | $+\frac{1}{2}$ | $4p^2$         |
| $_{103}\text{Lr}$ | 6 | 2 | -2    | $-\frac{1}{2}$ | $6d^1$         |
| Yb                | 4 | 3 | 3     | $+\frac{1}{2}$ | $4f^{14}$      |