

## Exercise 3.2-3 Electronic Polarization

### Illustration

Look at an atom with atomic number  $z$ .

- How large is the distance  $d$  between the (center of gravity) of the positive and negative charges for reasonable field strengths and atomic numbers, e.g. the combinations of

- **1 kV/cm**
- **100 kV/cm**
- **10 MV/cm**
- , the last one being about the ultimate limit for the best dielectrics there are,

and

- **$z = 1$**  (H, Hydrogen)
- **$z = 50$**  (Sn, (= tin), ...)
- **$z = 100$**  (?)

- Calculate the "spring constant" and from that the resonance frequency of the "electron cloud" (assume the nucleus to be fixed in space).



Link to the [solution](#)