

### Superconductivity

António Saraiva – 2008-02-11  
ajps2@hotmail.com

In the superconductor state, the medium behaves as a black hole for electrons. The force between electrons becomes zero. So superconductivity is a question of the “density” of the medium. The mass and the lattice spacing are the variables. It’s why temperature and pressure are also variables.

#### Force between electrons

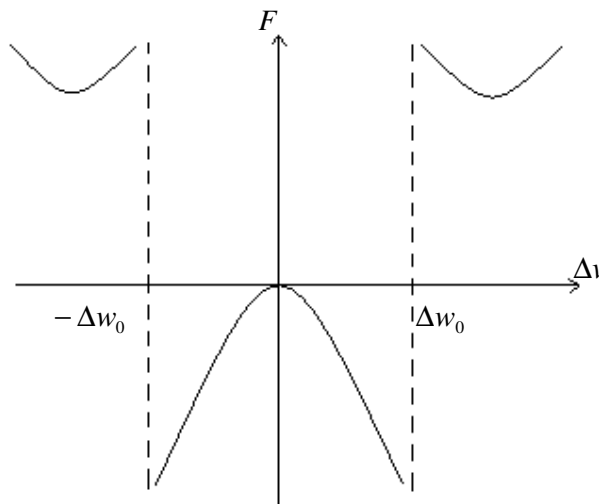
$$F = \frac{kh(c^2 - v^2)^2 f_0^4}{c^2(c^2 + vw_0)(w_0 + v)^3}$$

$$v = -c + \Delta v \quad \text{and} \quad w_0 = c - \Delta w_0$$

$$f_0 = 1.57 \times 10^{18} \text{ Hz}; \quad x_0 = 1.91 \times 10^{-10} \text{ m}; \quad \Delta w_0 = 8.2 \times 10^{-7} \text{ ms}^{-1}$$

$$m_0 = 1.16 \times 10^{-32} \text{ kg}$$

$$F \approx \frac{4khf_0^4 \Delta v^2}{c(\Delta v + \Delta w_0)(\Delta v - \Delta w_0)^3}$$



$F < 0 = \text{attraction}$

### Electron gravitational constant

$$G_e = \frac{k h f_0^4 x_0^2 + \sqrt{k^2 h^2 f_0^8 x_0^4 + 32 c^9 x_0^2 m_0^2 \Delta w_0}}{2 c^3 m_0^2}$$

$$\Leftrightarrow G_e = 2.2 \times 10^{32}$$

### Black hole formula

$$c = \sqrt{\frac{2Gm}{x}} \quad ; \quad c = \text{Light speed}$$

$$\Leftrightarrow \frac{m}{x} = \frac{c^2}{2G_e} = 2 \times 10^{-16}$$

For reaching superconductivity at normal temperature. the unit of mass of the lattice divided by the lattice spacing must be equal to  $2 \times 10^{-16}$ . For higher or lower values there is no superconductivity. Some elements will reach superconductivity by heating.

**Table of the superconductivity factor  $m/x$**   
*See Below:*

H 8.39 -18																	He 2.56 -17
Li 5.32 -17	Be 9.62 -17											B 1.18 -16	C 1.24 -16	N 1.14 -16	O 1.19 -16	F 1.45 -16	Ne 1.41 -16
Na 1.30 -16	Mg 1.65 -16											Al 2.03 -16	Si 1.97 -16	P 1.95 -16	S 2.07 -16	Cl 2.01 -16	Ar 2.10 -16
K 1.58 -16	Ca 1.94 -16	Sc 2.61 -16	Ti 3.11 -16	V 3.60 -16	Cr 3.82 -16	Mn 3.98 -16	Fe 4.03 -16	Co 4.45 -16	Ni 4.55 -16	Cu 4.77 -16	Zn 4.58 -16	Ga 4.44 -16	Ge 4.43 -16	As 4.63 -16	Se 4.49 -16	Br 3.91 -16	Kr 3.79 -16
Rb 2.87 -16	Sr 3.46 -16	Y 4.20 -16	Zr 4.81 -16	Nb 5.31 -16	Mo 5.78 -16	Tc 6.17 -16	Ru 6.32 -16	Rh 6.45 -16	Pd 6.76 -16	Ag 6.46 -16	Cd 6.23 -16	In 5.97 -16	Sn 6.08 -16	Sb 5.99 -16	Te 6.06 -16	I 5.55 -16	Xe 4.81 -16
Cs 3.73 -16	Ba 4.66 -16	Lu 6.58 -16	Hf 8.55 -16	Ta 9.29 -16	W 9.97 -16	Re 1.02 -15	Os 1.06 -15	Ir 1.06 -15	Pt 1.10 -15	Au 1.07 -15	Hg 9.62 -16	Tl 9.26 -16	Pb 9.20 -16	Bi 8.76 -16	Po 8.55 -16	At	Rn