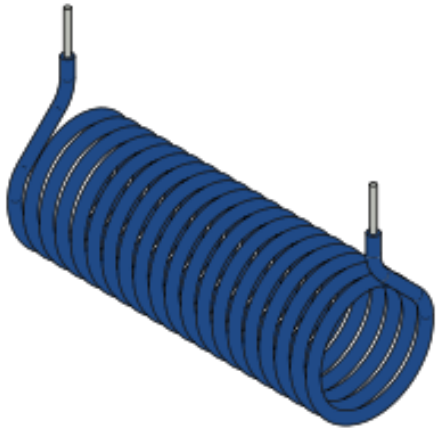
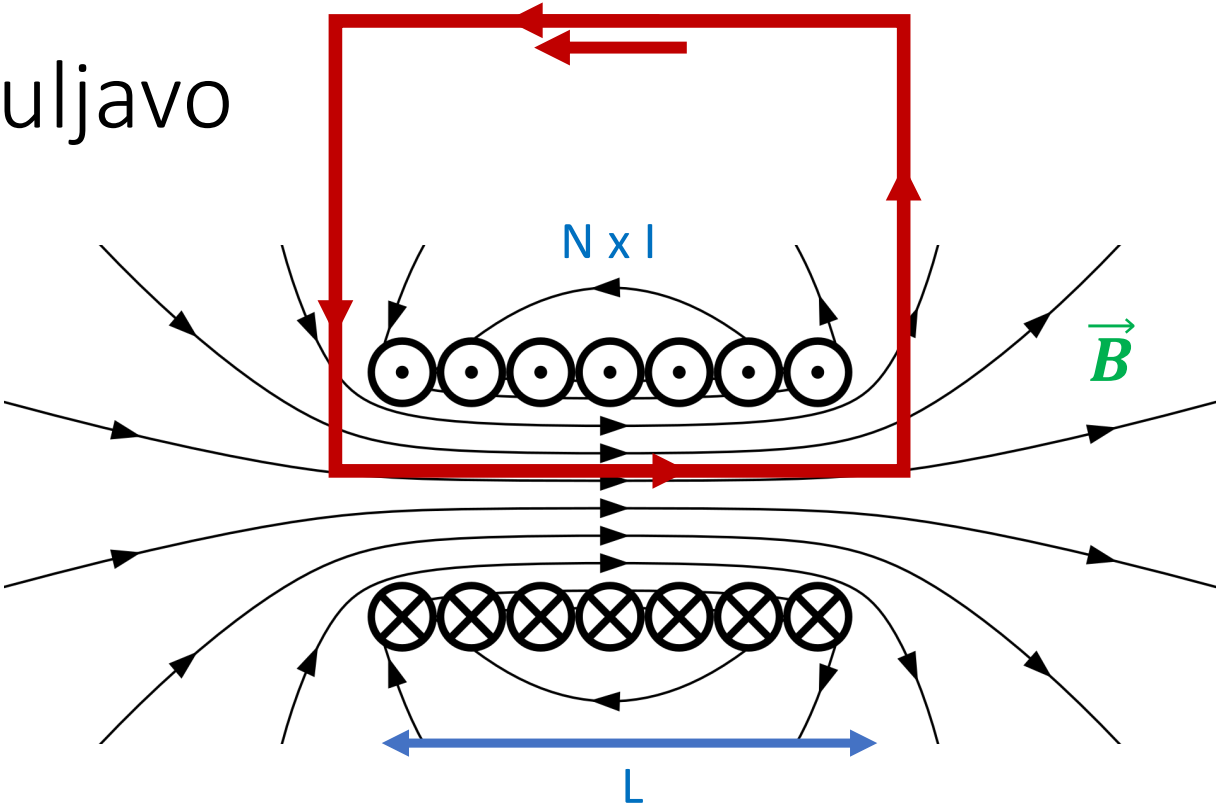
Amperov zakon za tuljavo



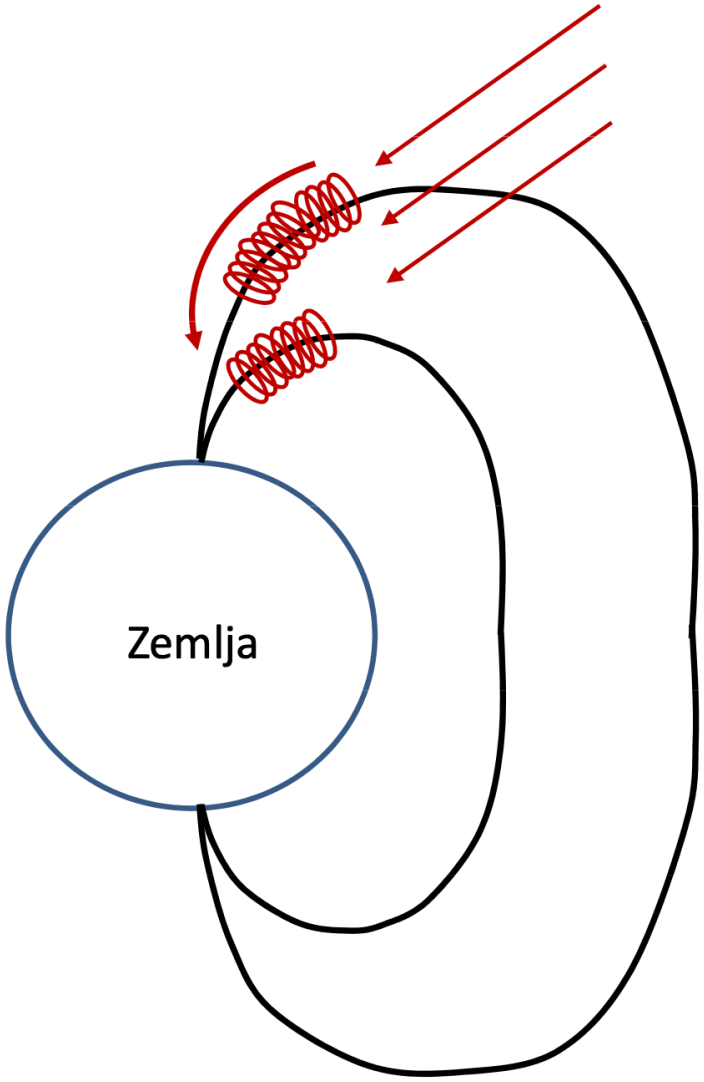


$$\oint_C \mathbf{B} \cdot \mathrm{d}\boldsymbol{l} = \mu_0 \iint_S \mathbf{J} \cdot \mathrm{d}\mathbf{S} = \mu_0 I_{\mathrm{enc}}$$

B L = μ_0 N I

Polarni sij

posledica magnetne sile na gibajoče se naboje

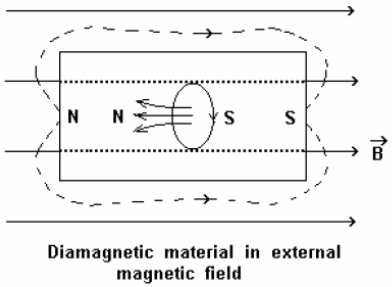


silnice magnetnega polja

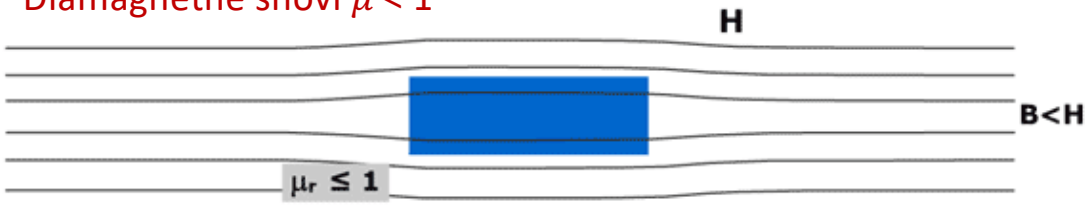
$$\vec{F} = e\vec{v} \times \vec{B}$$

Magnetna permeabilnost

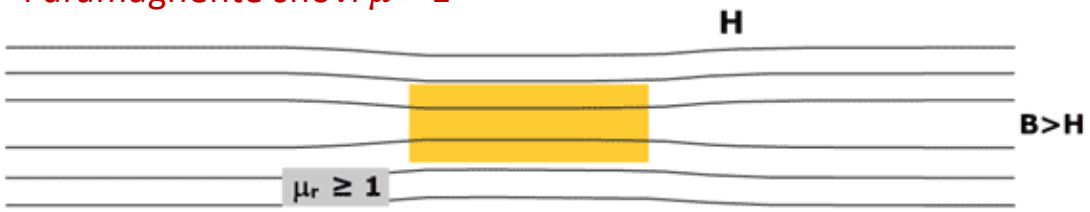
$$\vec{B} = \mu \mu_0 \vec{H}$$



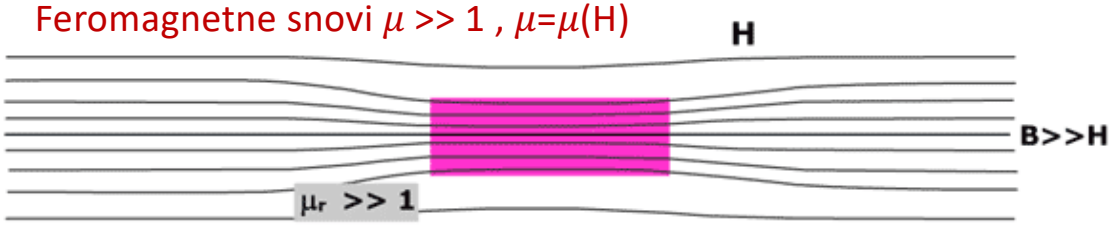
Diamagnetne snovi $\mu < 1$



Paramagnente snovi $\mu > 1$



Feromagnetne snovi $\mu >> 1$, $\mu=\mu(H)$



- Diamagnetne snovi ($\mu < 1$):
  - površinski tokovi zaradi zun. polja začnejo krožiti – ustvarijo se mag. dipoli in ošibijo polje.
  - srebro, svinec, baker, ogljik ....
- Paramagnetne snovi ($\mu > 1$):
  - permanentni dipoli v snovi, ki se v zunanjem mag. polju šibko uredijo (za malo časa...).
  - prehodni elementi, aktinidi, ‘redke zemlje’..
- Feromagnetne snovi ($\mu >> 1$):
  - veliki permanentni dipoli v snovi, ki se v zunanjem mag. polju močno uredijo – in tudi ostanejo urejeni dolgo časa...
  - železo, nikelj, kobalt, nekatere spojine (jekla..)

Magnetna permeabilnost in susceptibilnost

- Gostota mag. polja v snovi:

$$\vec{B} = \vec{B}_{\text{zun}} + \vec{B}_{\text{snov}} = \vec{B}_{\text{zun}} + \mu_0 \vec{M} = \mu \vec{B}_{\text{zun}} = \mu\mu_0 \vec{H}$$

magnetizacija snovi (tudi gostota dipolov v snovi...).

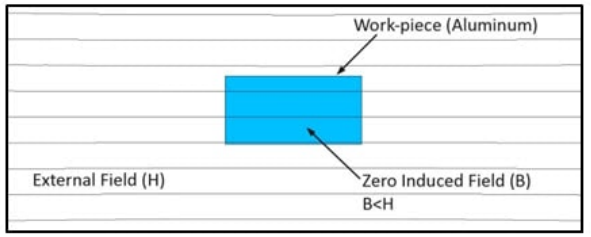
- Magnetizacija:

$$\vec{M} = (\mu - 1)\frac{\vec{B}_{\text{zun}}}{\mu_0} = \chi \frac{\vec{B}_{\text{zun}}}{\mu_0} = \chi \vec{H}$$

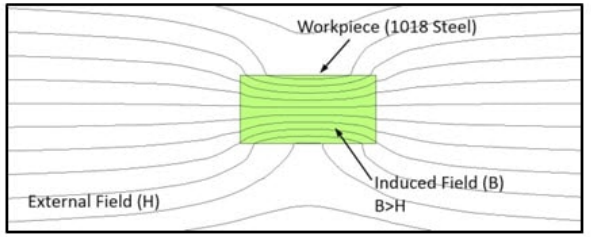
mag. permeabilnost

mag. susceptibilnost

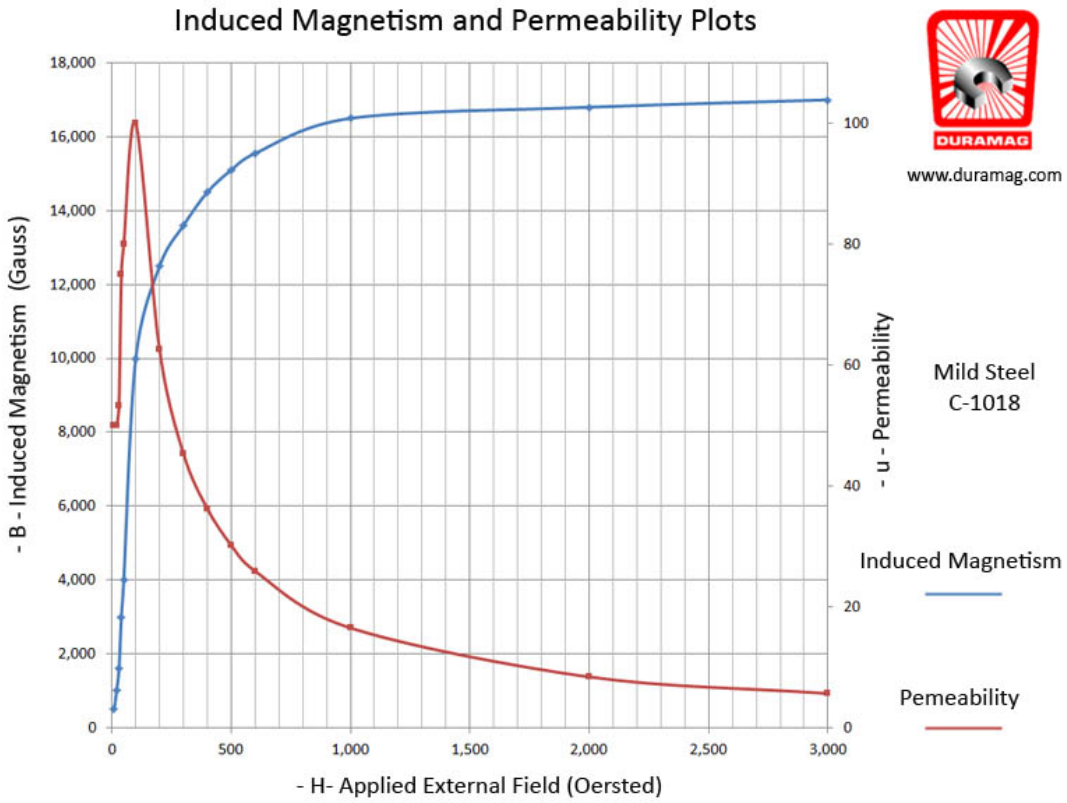
Applied Field H
Permeability μ = 1
Induced Field B = 0
B < H



Applied Field H
Permeability μ > 1
Induced Field B = μ x H
B > H



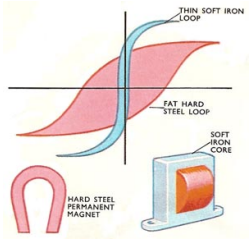
Magnetna permeabilnost feromagnetov

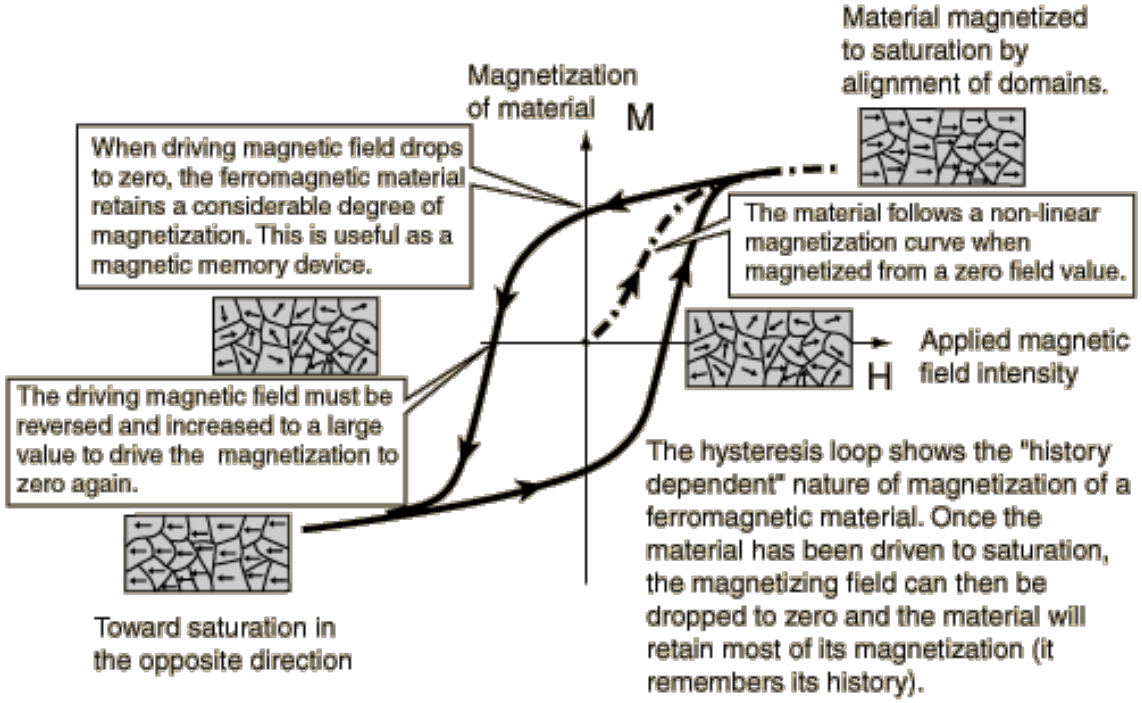


$$\vec{B} = \int \mu(\mathrm{H})\, \mu_0\, \mathrm{d}\vec{H}$$

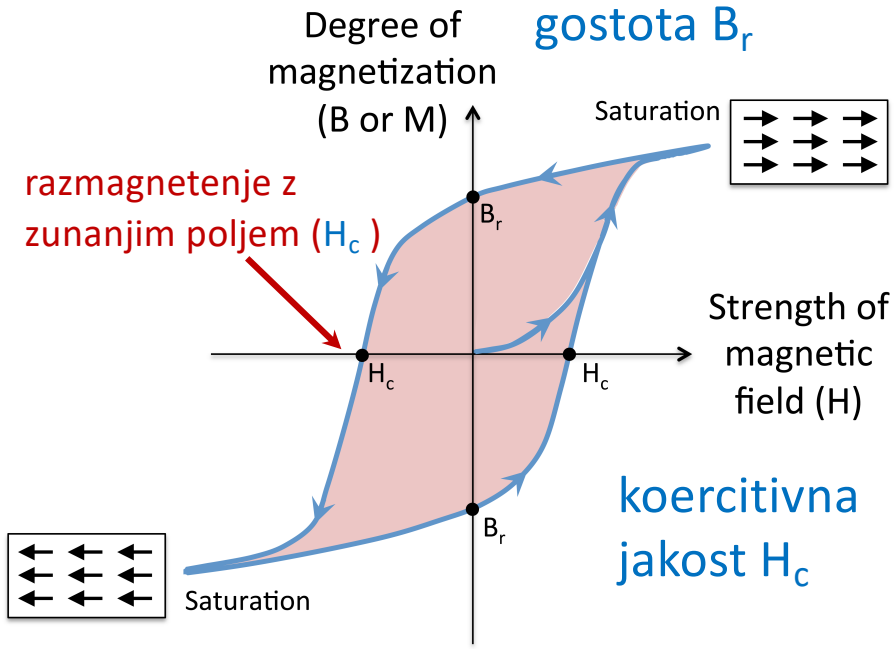
$$\mu(\mathrm{H}) = \frac{dB}{dH}$$

Histerezna zanka





remanentna gostota B_r



koercitivna jakost H_c