**Answer on** Question #62734, Physics / Electromagnetism

what would happen if the coil had lots of turns instead of just one?

**Solution:**

Inductance L for ideal solenoid: $L = \mu_0 \mu N^2 \frac{A}{l}$ (1),

where $\mu_0$ is magnetic constant, $\mu$ is magnetic permeability of environment inside the solenoid, N is the number of turns, A is the inner core area, l is the length of the coil.

Of (1) $\Rightarrow$ inductance L of a coil will increase in $N^2$ times

Self inductance L of a coil: $L = N \frac{\Phi}{I}$ (2),

where N is the number of turns, Φ is the magnetic flux, I is a amperage.

Of (2) $\Rightarrow$ self inductance L of a coil will increase in N times

The energy E of the magnetic field in the coil: $E = \frac{LI^2}{2}$ (3)

Of (3) $\Rightarrow$ energy E of the magnetic field of the coil will increase

Electromagnetic induction: $\varepsilon = -N \frac{d\Phi}{dt}$ (4),

where N is the number of turns, dΦ is a changing of magnetic flux during the time dt

Of (4) $\Rightarrow$ electromagnetic induction ε will increase

**Answer:**

if the coil had lots of turns instead of just one:

1) inductance of a coil will increase,
2) energy of the magnetic field will increase,
3) electromagnetic induction will increase