Faraday's Law Paradox 9 October 2012

https://groups.google.com/forum/?hl=ru&fromgroups#!topic/sci.physics.electromag/su7Jfa9yNEQ

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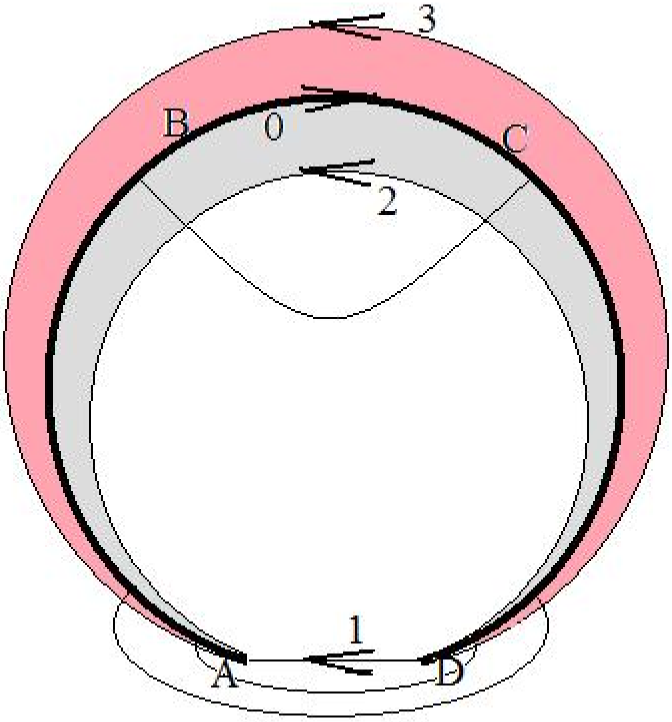
Faraday's law defines how a varying magnetic field creates electric field. For the potential to be nonzero, EF must be nonzero. However, if we look at the electric field inside the conductor, it is not so. According to an electrostatic law, the force on the free electron must be zero; otherwise, the distribution of free electrons will change so that the electric field on the free electron becomes zero. On the surface, the electric field Es must be perpendicular to the surface. Considering such electric field in conductor, the potential between the point A and D is zero.

How can free electrons stay still against nonzero EMF? And how can EMF exist when the electric field on all free electrons is zero or perpendicular to the surface? No explanation exists now. So, there is a conflict between Faraday's law and the electrostatic law. I call this conflict the Faraday's law Paradox. Faraday's law is the last major law of the electromagnetic theory to fall.

This discussion is very strange. I cannot understand your problem. You cannot use the word "potential", because the E-field is nonpotential.



I have drawn three lines of force roughly and four open paths: 1, 2, 3, 0 = ABCD.

$$\oint_{DABCD} (\mathbf{E}\cdot d\mathbf{l}) = \frac{d}{dt}\iint_{a\ in\ DABCD} (\mathbf{B}\cdot d\mathbf{a}) = \mathcal{E}\text{, where } \mathcal{E} \text{ is the electromotive force,}$$

$$\text{i.e. } \oint_{1+0} (\mathbf{E}\cdot d\mathbf{l}) = \frac{d}{dt}\iint_{a\ in\ 1+0} (\mathbf{B}\cdot d\mathbf{a}) = \mathcal{E}.$$

As $\int_{ABCD} (\mathbf{E}\cdot d\mathbf{l}) = 0$, we have $\int_{DA} (\mathbf{E}\cdot d\mathbf{l}) = \mathcal{E}$.

Area inside D2ABCD is grey, and we have approx $\oint_{D2ABCD} (\mathbf{E}\cdot d\mathbf{l}) = \frac{d}{dt}\iint_{a\ in\ D2ABCD} (\mathbf{B}\cdot d\mathbf{a}) \approx \frac{1}{10}\mathcal{E}$

Area inside D3ABCD is pink, and we have approx $\oint_{D3ABCD} (\mathbf{E}\cdot d\mathbf{l}) = \frac{d}{dt}\iint_{a\ in\ D3ABCD} (\mathbf{B}\cdot d\mathbf{a}) \approx -\frac{1}{10}\mathcal{E}$

R. Khrapko