Is the tangential EMF due to a tilt of the coil?

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In order to solve the mystery presented by my experiment Tangential EMF experiment that shows the lighting of LEDs when a coil rotates tangentially near a magnet, Jos Bergervoet proposed that the lighting may be caused by a tilt of the coil. Effectively, if the coil is tilted at an angle α with respect to the direction of the magnetic field **B**, it will enter the area enclosed by the coil and, when rotating, the flux will vary and induce a voltage in the coil.

Figure 1 shows an easy mathematical vision of a tilted coil. The perfect coil A is perfectly parallel to **B**, no flux crosses it (a). With a tilt angle of α, the tilted coil D will receive a flux (b). In order to visualize this flux, we represent the tilted coil D with an equivalent composed coil made with a coil Y perfectly parallel to **B** and a small coil X perfectly perpendicular to **B** (c). This way, the flux that crosses the coil X equals that of the tilted coil D and when rotating the same voltage is induced in the coil X.

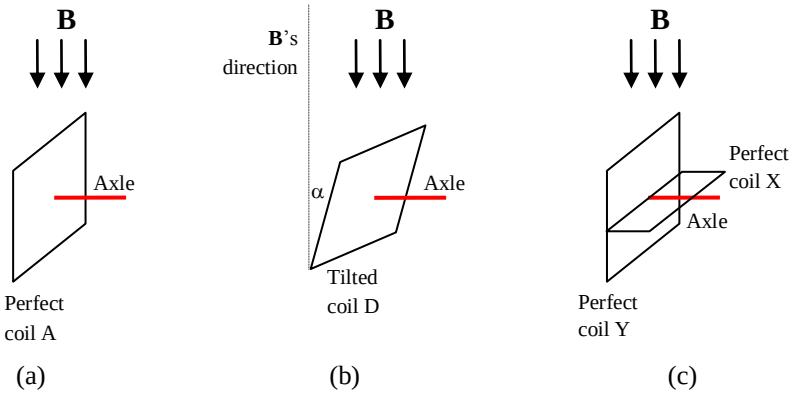

Figure 1

I have tested a tilted coil in an experiment. I rotated the coil in 3 positions: 1) In the center of the magnet. 2) The side of the coil against the edge of the magnet. 3) The face of the coil in front of the edge. In the following, for simplifying the presentation, the 3 positions are referred to as "Center", "Side/edge" and "Face/edge" respectively (see Figure 2).

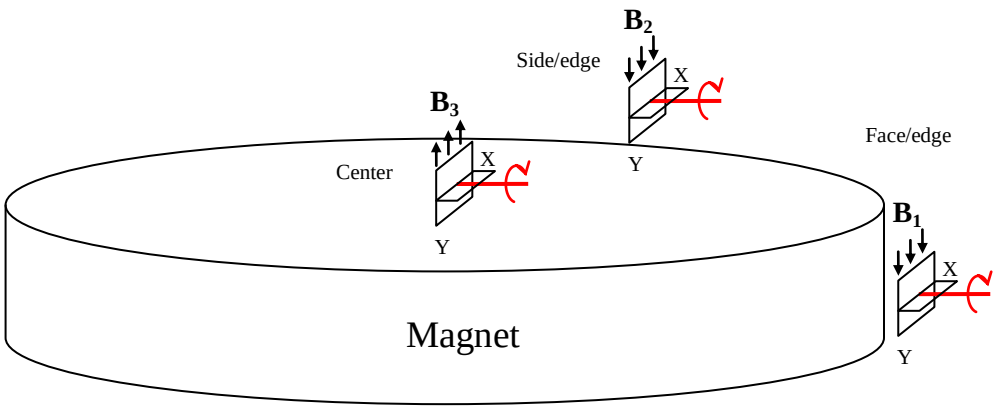

Figure 2

Here is the video of the experiment.
http://youtu.be/UUTwqID-hmk?list=UUuJXMstqPh8VY4UYqDgwcvQ

Sequences 1-4: Experiment with unknown tilt.

1) The coil is facing the edge of the magnet, light is on. Question: is the coil tilted? Is this light due to the tilt?
2) If a tilt exists, then the flux will vary as explained above using Figure 1.
3) The coil is put on the position Side/edge; the field and the flux variation remain the same. But the light is off proving that there is no induced voltage.
4) In the center, the field intensity is of the same order. No light. So, no induced voltage either.

Sequences 5-11: With a tilted coil, what will be the behavior of the coil?

5) We give a small tilt angle to the coil, rotate it in the center.
6) No light. The magnetic field in the center $\mathbf{B_3}$ is strong. This proves that the tilt is too small to generate enough voltage.
7) We increase the angle of the tilt and rotate the coil in the center of the magnet.
8) The LEDs light up slightly. With relatively strong field the light is weak. We conclude that the tilt induced voltage is weak.
9) The coil is moved to the position Side/edge where the field is $\mathbf{B_2}$.
10) No light, meaning that the field near the edge is less intense then in the center, $\mathbf{B_2<B_3}$.
11) The coil is moved to the position Face/edge. The field is the same as above, $\mathbf{B_1=B_2}$, weaker than the center, $\mathbf{B_1<B_3}$, but the light is intense, meaning that in a weaker field the voltage is many times stronger. We conclude that the voltage in the position Face/edge is not induced by the tilt of the coil.

Sequences 12-14

12) We reposition the coil to zero tilt.
13) Rotation in the center. Since the tilt is zero the light is off.
14) The coil is on the position Face/edge, the LEDs light up joyously, chanting: “We do not need tilt to illuminate!”

So, the conclusion is: when rotating tangentially, the tilt of the coil has nothing to do with the lighting of the LEDs. The light is due to tangential EMF.