Application No. 66: Bet on a Rolling Ball

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How to win bets with the help of super magnets

My friend and I will each allow a sphere of the same size to roll down the channel of an aluminum bracket and be stopped by a towel lying on the other end of the table. I make a bet with my friend for 99 Rubles and 10 apples that I can slow the fall of my sphere and make it stop even before the towel only by using psycho-kinetic powers and deep concentration. Further, his sphere will roll uncontrolled into the towel.

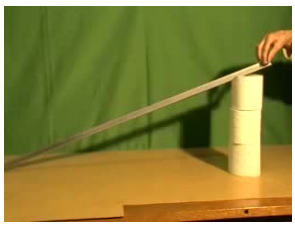
Required material:

- Approx. 1 metre aluminum bracket 20 X 20 mm
- 1 magnetic sphere (K-19-C (www.supermagnete.de/eng/K-19-C)) (at a pinch a K-13-C (www.supermagnete.de/eng/K-13-C) or a K-06-C (www.supermagnete.de/eng/K-06-C))
- 1 steel sphere with 19 mm diameter (at a pinch a 12,7 or 6 mm), for instance taken from a ball bearing
- 3 rolls of toilette paper to hold the bracket
- 1 rolled-up towel or something similar to stop the spheres. (The magnetic sphere must not roll off the table and onto a stone floor or it will splinter.)

My friend takes the bet and is allowed to roll his sphere first. It flies down the aluminum bracket and reaches the towel in about one second.

Video

I concentrate fully on my task ;-) then let my sphere roll down the bracket. Unlike my friends sphere, mine rolls slowly, requiring nearly 10 seconds to reach the table and even stops before reaching the towel. I've won the bet hands down.



Video

The explanation: I gave my friend a steel ball but myself used a SuperMagnet sphere made of neodymium-iron-boron of the same diameter.

Video

The rolling movement of the magnetic sphere inside the aluminum angle bracket creates a voltage of approximately 10 microvolts (Dynamo Principle). The electrical current created by this voltage differential causes a magnetic field in the aluminum. This magnetic field is out-of-phase with the magnet itself, i.e. it moves against the magnetic sphere, acting like a brake. For this reason the forward motion of the magnetic sphere is strongly reduced.

Only a bracket made of copper or silver could make the trick more impressive because both copper and silver conduct electrical current better than aluminum.

Note from the supermagnete team:
Further experiments on the topic of induction:

- "Aluminum Foil as Contact-Free Parachute" (www.supermagnete.de/eng/project77)
- "Magnetic Sphere Lacks Momentum" (www.supermagnete.de/eng/project105)
- "Series of experiments" (www.supermagnete.de/eng/project194)
- "project329" (www.supermagnete.de/eng/project329)

Articles used
1 x K-19-C: Sphere magnet Ø 19 mm (www.supermagnete.de/eng/K-19-C)

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