

Demo 12-13

Spinning Chain

A flexible chain is rapidly rotated on a spinning disc. It is then pushed gently off the disc.[†] Its rapid rotation causes it to retain its circular shape, so it rolls along just as though it were solid, and even jumps when it hits a barrier, as shown in *Figure 1*. Both real time and slow motion video are shown on the video.



Figure 1

[†] Sutton, *Demonstration Experiments in Physics*, Demonstration M-139, High-speed Chains.

We'll use this limp circular chain to demonstrate an intriguing property of circular motion.

The chain is pushed onto a wooden disc attached to a motor, which spins at high speed when switched on.

Now that the disc and chain are spinning, what will happen to the chain if we carefully push it off the disc?

The chain rolls along the table as if it were a solid ring.

Here's a longer shot of the same action with a low barrier placed in the path. The chain bounces like a solid object.

Here's the same action repeated in slow motion.

Equipment

1. Motor-driven rotor with a slightly tapered disc.
2. Loop of flat chain whose diameter matches that of the average diameter of the tapered disc.
3. Wooden push rod.
4. Rectangular piece of rubber sheet to aid rotating loop gaining frictional contact with the table top.
5. Obstacle for loop to jump over.