

# AERODYNAMIC PARADOX – EXAMPLES

MED 19.10



## **Material:**

Item Code	Qty	Description
DS101-1G	1	Support base, large, L=500 mm
DS093-04	1	Sliding saddle "Sepp", H=40 mm
P7240-1G	1	Support rod, round, L=500 mm, D=10 mm
DS400-3K	1	Boshead cross-pattern, Demo, green
DM701-2L	1	Blower 12 V
P3130-2Q	1	Fixed voltage transformer 12V DC/10 A
DM701-2K	1	Tube adapter for blower
DM730-3T	1	Funnel with sleeve
DM360-5S	1	Ball, D=60 mm, styrofoam
DM730-4S	1	Disk with tube adapter
DM730-5S	1	Disk with rim
DM385-2S	2	Pendulum bob, steel, D=1"
DG200-1S	1	Cord, white, D=1.7 mm, L=5 m

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## Purpose

The negative pressure in fast streaming gases can have a bigger effect as the force through inflow.

## Preparation

- the sliding saddle is fixed on the support base
- the support rod with 500 mm is inserted into the sliding saddle, the cross-patterned bosshead is fixed at the top end of the support rod
- the tube adapter is put onto the blower
- the funnel with sleeve is attached to the tube adapter
- the rotary knob for the flow speed of the blower is turned to the very left
- the blower is powered by a fixed voltage transformer (12 V DC, min. 6 A)
- the blower is fixed to the bosshead.

## Experiment 1 – Funnel and ball

We turn on the blower and slowly increase the flow speed to 10 m/s.

We bring the ball closer to the funnel from below and observe the pressure on the ball.



## Result

When the ball is just below the funnel wall, it is pressed into the funnel and does not fall down.

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## Experiment 2 – Disk

Instead of the funnel we attach the disk with tube adapter to the blower. We turn on the blower and slowly increase the flow speed to 10 m/s.

Now we bring the disk with rim closer from below and observe what is happening.



## Result

As soon as the disk with rim is close enough to the Disk with tube adapter it gets sucked in.

With our fingers we pretend the disk from gliding away. When we succeed the disks are “sucking” themselves to each other.



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## Experiment 3 – Balls

We cut off a piece of cord (approximately 50 cm) and make small loops at both ends.

The blower is fixed to the rod in such a way that the air stream is going straight up.

We place the two balls into the loops and hold them on the same height level at a distance of 3 or 4 cm as displayed on the image.

We turn on the blower and slowly increase the flow speed to the maximum.



## Result

The balls are not being pushed away from each other but try to close the distance between them. The higher pressure from outside pushes the balls together.

