Charge transport with a pendulum

Task and equipment

Information for teachers

Additional Information

The students learn that a metallic pendulum can independently transport charges so that at least one body is partly discharged.

Suggestions for Organization and Implementation

- Care should be taken to achieve an as strong as possible charging up of the Faraday-beaker so that the pendulum is not first set in motion at a too small distance between pendulum and induction plate.
- The pendulum should be positioned as low down as possible. It is sufficient when about 10 mm of the pendulum is adjacent to the beaker.

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Charge transport with a pendulum

Task and equipment

Task

A pendulum transports charges

Show that a pendulum can transport charges.

Student's Sheet

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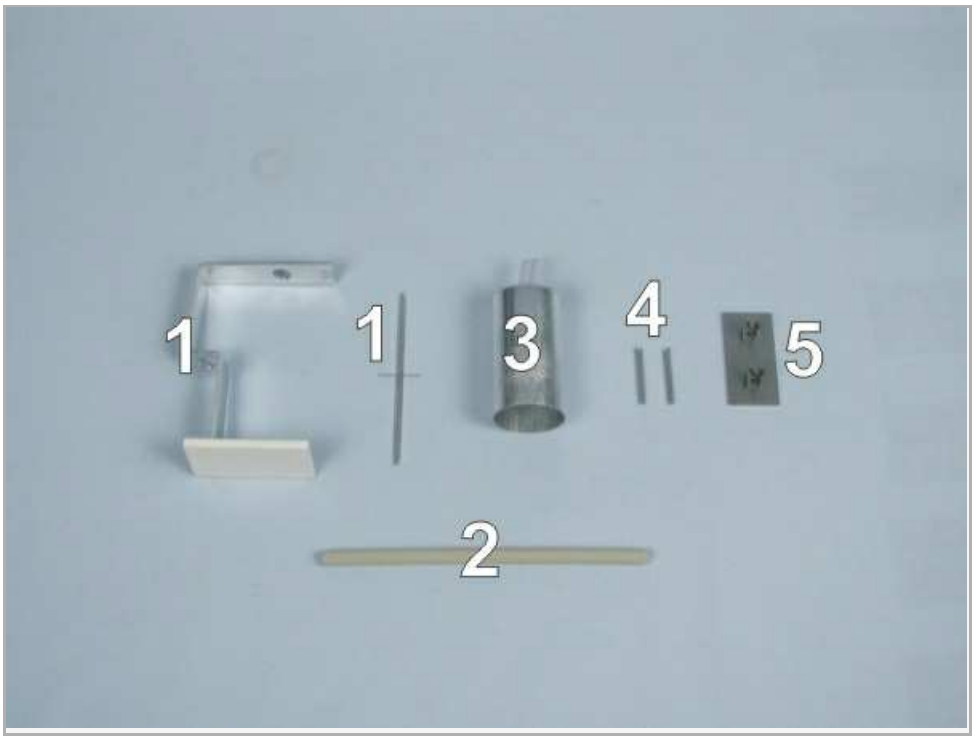
Equipment



Position No.	Material	Order No.	Quantity
1	Electroscope w. metal pointer	13027-01	1
2	Polypropylene rod, d. 8mm,l.175mm	13027-07	1
3	Faraday pail, d. 40mm, h. 75mm	13027-03	1
4	Pendulums, pair, f.electrostatics	13027-15	1
5	Electrostatic ind.plate,30mmx60mm	13027-12	1
Additional material			
	dry, rough paper		1 sheet

Set-up and procedure

Set-up

- Position the pointer in the electroscope (Fig. 1, Fig. 2) and carefully fix the Faraday-beaker to the electroscope with a screwing movement until the Faraday-beaker makes contact with the electroscope (Fig. 3).

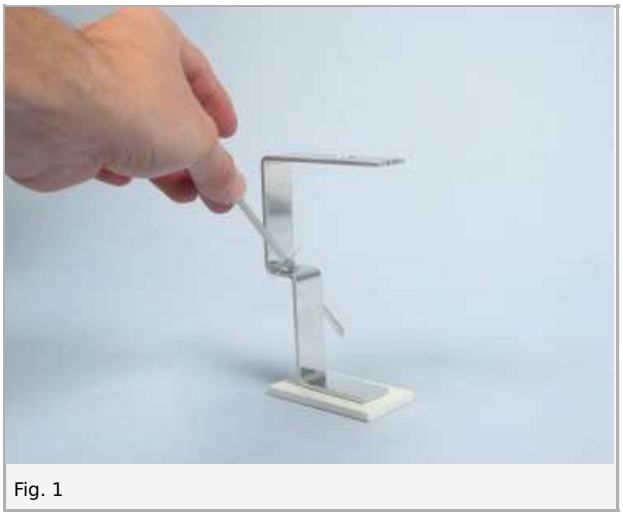


Fig. 1

Fig. 2

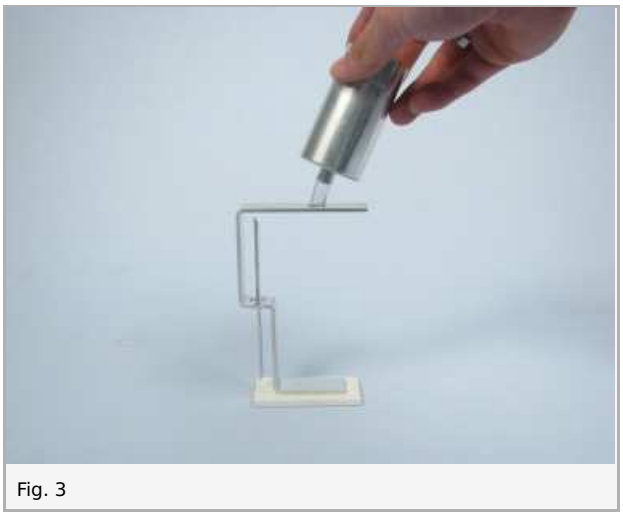


Fig. 3

- Hang the pendulum pair over the rim of the beaker. One pendulum is inside the beaker, the other one outside. The outer pendulum piece should be positioned so that approx. 10 mm of its body lies on the Faraday-beaker (Fig. 4).

Fig. 4

Procedure

- Rub the polypropylene rod with paper (Fig. 5) and charge up the Faraday-beaker with it (Fig. 6).
- Repeat the charging up until the pointer of the electroscope is maximally displaced.

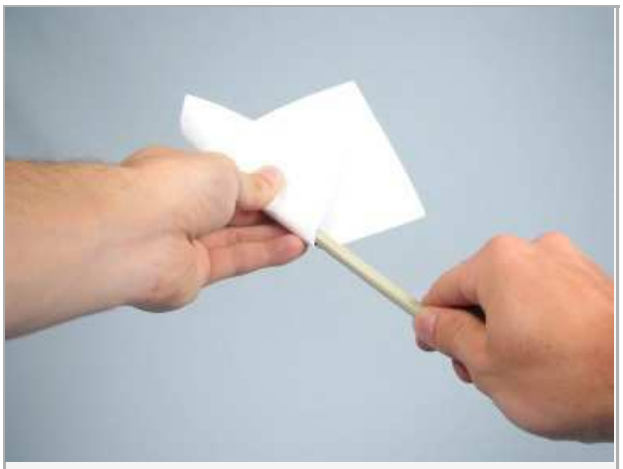


Fig. 5

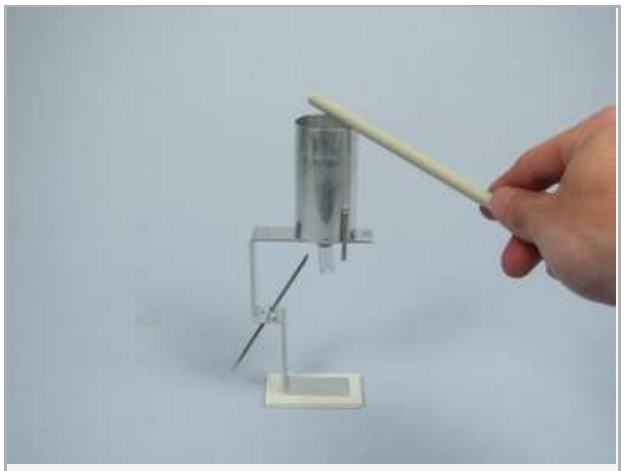


Fig. 6

- With the hand holding a clip of the induction plate, move the induction plate very slowly towards the pendulum hanging outside the Faraday-beaker. The induction plate should be held as parallel as possible to the pendulum (Fig. 7).
- Observe the pendulum and the pointer and note your observations in the report.

Fig. 7

Report: Charge transport with a pendulum

Result – Observations

Describe the pendulum's movement and the accompanying change in the pointer's deflection.

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Evaluation – Question 1

Explain the sequence of events using your knowledge about the transport of charges and the forces between charges.

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