



ORION
s c i e n c e



PHYSICS CATALOGUE



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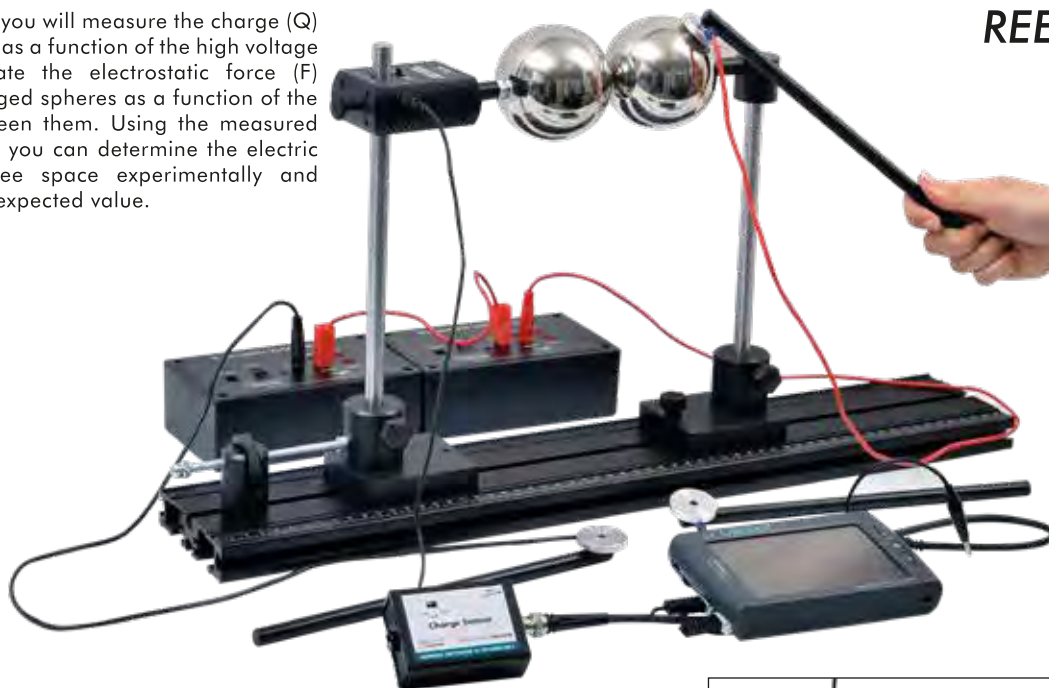
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COULOMB'S LAW

REEE14-V

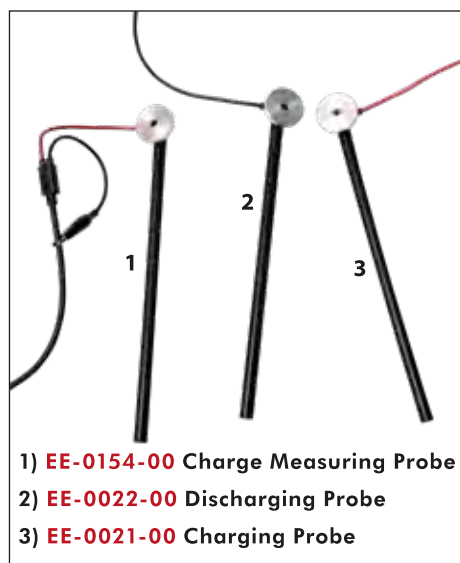
Description

In this experiment you will measure the charge (Q) on a metal sphere as a function of the high voltage (V) and investigate the electrostatic force (F) between two charged spheres as a function of the distance (d) between them. Using the measured force and charge, you can determine the electric permittivity of free space experimentally and compare it to the expected value.



ST-0208-00 Charge Spheres

- Diameter: 76 cm
- Material Type: Stainless Steel

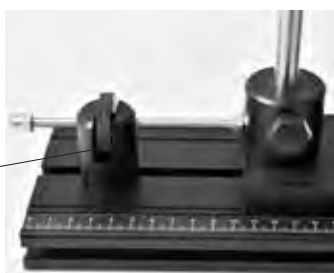


- 1) EE-0154-00 Charge Measuring Probe
- 2) EE-0022-00 Discharging Probe
- 3) EE-0021-00 Charging Probe



ST-0111-00 Sphere Holder Apparatus

The Vernier Force Sensor attached to sphere measures the Coulomb Force.



ME-0039-00 Distance Adjusting Mechanism

Distance between the two spheres can be adjusted to submillimeter accuracy.

Order Information

Item Code	Item Name
ST-0208-00	Charge Spheres (2 Pcs).....
ST-0175-00	Bench (60 cm).....
ST-0206-00	Sphere holders with bench slider (2 Pcs).....
ST-0111-00	Sphere Holder Apparatus.....
EE-0021-00	Charging Probe.....
EE-0022-00	Discharging Probe.....
EE-0154-00	Charge Measuring Probe.....
ME-0039-00	Distance Adjusting Mechanism
EE-0120-02	Connection Cable (20 cm).....
CRG-BTA	Charge Sensor-Vernier (required, not included).....
ZMSC136X	Vernier Electrostatic Voltage Source (required, not included)...
DFS-BTA	Vernier Dual-Range Force Sensor (assembled to set).....
LABQ2	LabQuest® 2 (required, not included).....

Distance (d) between the two spheres is measured by stripped ruler on bench and manually entered into LabQuest® 2

Required Units

Charge Sensor CRG-BTA	Dual-Range Force Sensor DFS-BTA
Electrostatic Voltage Source	LabQuest® 2 LABQ2

CURRENT BALANCE

REEE02

Description

With the current balance experiment, forces acting on a current carrying wire in a magnetic field are measured accurately over varying currents, wire length and coil angles.



Conductive wire is placed between the magnetic poles of a magnet. Magnetic force acting on the magnets can be changed by current intensity, wire length and current direction. The magnetic force changes weight of the magnets. The change is observed with digital balance

DC Current Source

EE-0006-00

Digital Display Security Banana Sockets Continuously Adjustable



Included Accesories



EE-0013-00 Wire Board
Variable Length: 1-5 cm



EE-0014-00 Rotating Coil
Graduated between 0-180°
Accuracy: 5°
10 turns



EE-0011-00 Magnet Set
2 Magnets
Gap : 5 mm , 22 mm
Magnetic Field: 0.4 T , 0.14 T

Order Information

Item Code	Item Name
EE-0006-00.....	DC Current Source 220 V.....
EE-0006-01.....	Current Supply (Optional) (Chinese Model).....
EE-0009-00.....	Digital Scale Base.....
ST-0017-00.....	Conductor Holder.....
EE-0011-00.....	Magnets (Large and Small Spaced).....
EE-0013-00.....	Conductive Wire Set (Variable Length).....
EE-0014-00.....	Rotating Coil.....
ST-0018-00.....	Screws.....
ST-0016-00.....	Support Rod.....
EE-0120-05.....	Connection Cables (50 cm, 2 Pcs).....

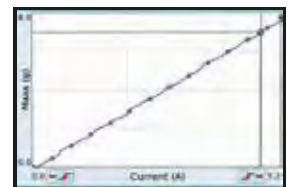
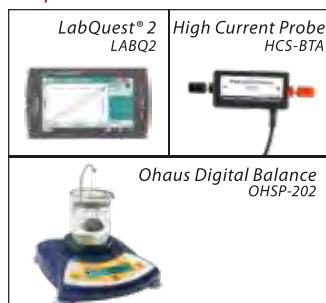
CURRENT BALANCE-VERNIER VERSION

REEE02-V

Forces acting on a current carrying wire in a magnetic field are measured using the Vernier Current Probe, Ohaus Digital Balance and LabQuest® 2.



Required Units



Current Vs Mass Graphic Plotted by LabQuest® 2



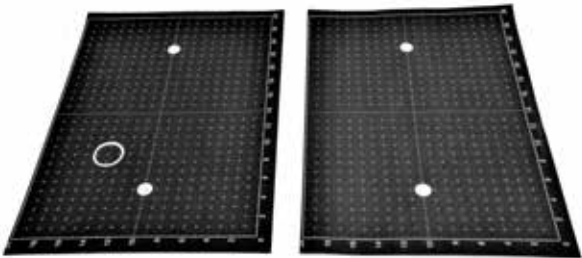
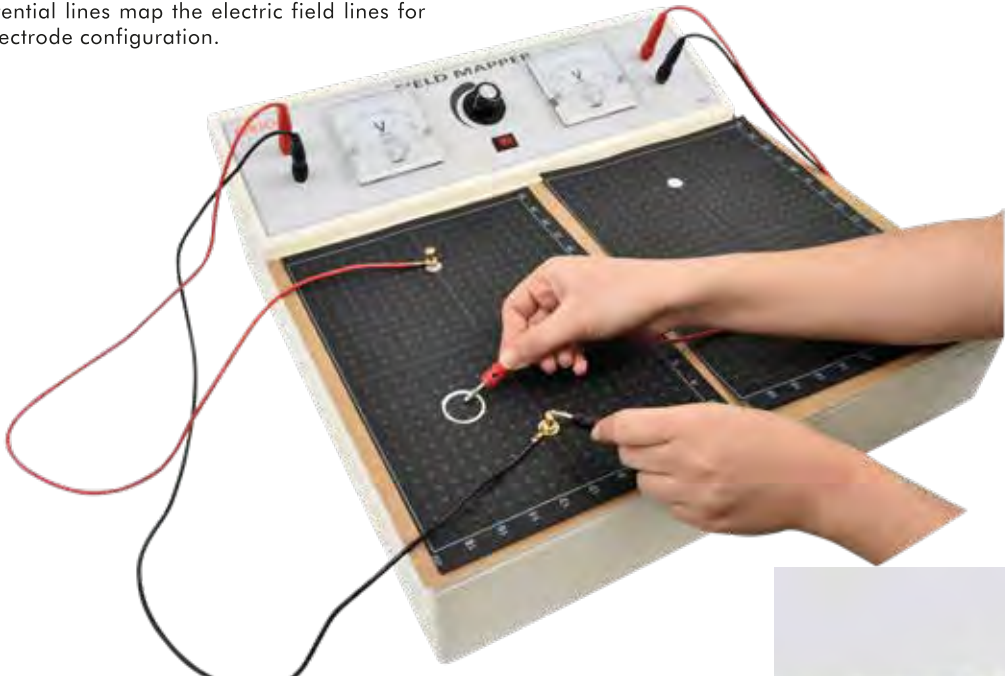
EE-0009-01 Base is used in this version instead of EE-0009-00 Base with digital scale

Description

Explore equipotential surfaces and lines in the space between two equal and opposite point charge analogs (electrodes) and from these equipotential lines map the electric field lines for each electrode configuration.

EQUIPOTENTIAL LINES

REEE04



Conducting Papers (silver painted)



A conductive ring creates a region with equal potential on and inside the ring.



Continuously Adjustable Output Voltage

Voltmeter 1 shows the applied output voltage between electrodes. Voltmeter 2 shows voltage of any conductive point with respect to the ground electrode.



Order Information

Item Code	Item Name
EE-0038-00	Equipotential Lines Kit.....
EE-0039-00	Conducting Paper (with Conductive Circle).....
EE-0039-01	Conducting Papers (without Conductive Circle, 2 Pcs).....
ST-0072-00	Conducting Pins (4 Pcs).....
ST-0073-00	Millimetric Paper Notebook.....
ST-0029-00	Copy Paper (10 Pcs).....
ST-0081-00	Ruler.....
EE-0120-05	Connection Cables (50 cm, 4 Pcs).....
EE-0133-00	Power Loading Cable (with Cable Lug, 2 Pcs).....

EE-0038-00 Equipotential Lines Kit
Power supply and voltmeters in single case.
Can also be used to store components together.

ELECTRIC FIELD AND DIELECTRIC CONSTANT IN PLATE CAPACITORS

REEE17-V



Description

Allows investigation of parallel plate capacitance, exploring the inverse proportionality against spacing, and the effect of different dielectric materials.



EE-0146-01 Plate (with conductive rod)

EE-0146-02 Plate (with isolated rod)

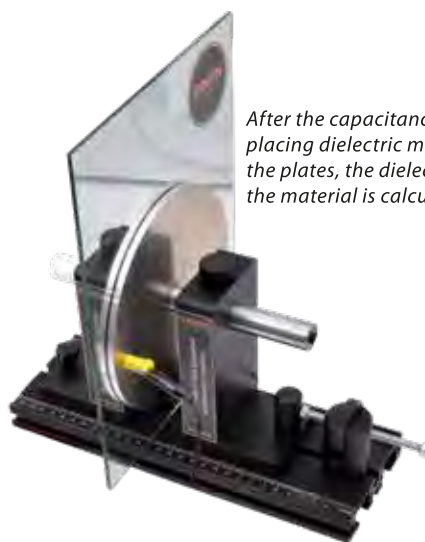
Voltage is applied to the isolated plate and charge is measured on it. Capacitance of metal plate is calculated.

Dielectric Materials

ST-0222-00 Plastic Plate

ST-0222-01 Paperboard Plate

ST-0222-02 Glass Plate



After the capacitance is calculated; by placing dielectric materials between the plates, the dielectric constant of the material is calculated.

Order Information

Item Code	Item Name
EE-0146-01	Metal Plate (with Conductive Rod)
EE-0146-02	Metal Plate (with Isolated Rod)
ST-0175-00	Bench (30 cm)
EE-0147-00	Power Supply (450 V DC)
EE-0154-00	Charge Measuring Probe
EE-0021-00	Charging Probe
ST-0222-00	Plastic Plate
ST-0222-01	Paperboard Plate
ST-0222-02	Glass Plate
ST-0233-01	Plate Holder
ST-0233-02	Plate Holder (with Micrometer Support)
ME-0039-00	Distance Adjusting Apparatus
EE-0120-05	Connection Cable (50 cm)
CRG-BTA	Vernier Charge Sensor (required, not included)
LABQ2	LabQuest® 2 (required, not included)

Required Units

Charge Sensor
CRG-BTA



LabQuest® 2
LABQ2



Description

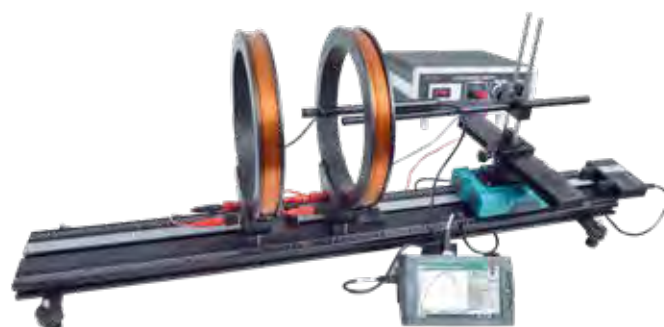
Observe the magnetic field distribution in the immediate volume around the axis of Helmholtz coils, using Vernier Magnetic Field Sensor and LabQuest® 2

HELMHOLTZ COILS

REEE09-V



HELMHOLTZ COILS WITH VERNIER ENCODER SYSTEM



Position and magnetic field graph plotted automatically by LabQuest® 2

**Helmholtz Coils**

- 2 Coils
- Material Type: Copper
- 190 turns

Required Units

LabQuest® 2 LABQ2	Magnetic Field Sensor MG-BTA

Additional Units

	Vernier Motion Encoder Receiver MEC-BTD
--	--

Stripped Bench**Order Information**

Item Code	Item Name
EE-0006-00.....	DC Current Source 220 V.....
EE-0006-01.....	Current Supply (Optional) (Chinese Model)
EE-0057-00.....	Helmholtz coil Pair
ST-0175-00.....	Bench
ST-0178-00.....	Probe Stand
ST-0177-00.....	Probe Holder
ST-0176-00.....	Probe Alignment Screen
EE-0120-05.....	Connection Cables (50 cm, 3 Pcs).....
LABQ2.....	LabQuest® 2 (required but not included)
MG-BTA.....	Vernier Magnetic Field Sensor(required, not included)

INDUCTION WITH PENDULUM

REEE19-V

Description

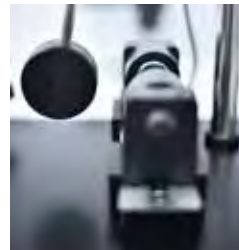
The relative motion of coil to the magnet creates an induced current on induction coil. The amount of the current produced is function of the magnetic field and the oscillation of the pendulum.



Magnet track with metric scale



Manual gap adjustment of magnets



ME-0027-00 Induction Coil With Pendulum Rod

- 1600 Turns
- 80 g



Voltage and angular velocity values are observed on LabQuest® 2 screen.

Order Information

Item Code	Item Name
ME-0026-00.....	Experiment Main Unit (with Support Rod, Angle Scale Vernier Rotary Motion Sensor and Voltage Probe).....
ST-0180-00.....	Track
ST-0180-01.....	Magnet Set (2 Pcs).....
ME-0027-00.....	Pendulum Rod with Induction Coil.....
RMV-BTD.....	Vernier Rotary Motion Sensor (assembled to unit)
VP-BTA.....	Vernier Voltage Probe (assembled to unit).....
LABQ2.....	LabQuest® 2 (required, not included).....

PHOTOELECTRIC EFFECT

REMA01

Description

A classic experiment that explores Hertz's and Einstein's Photoelectric Effect by experimentally determining the value of Planck's Constant and finding the work function of a given metal (cathode) surface.



EE-0128-00 Light Source Box

6 different LED light sources of wavelengths $\lambda = 385 \text{ nm}$, 470 nm , 470 nm , 502 nm , 575 nm and 605 nm , together with a vacuum Phototube



EE-0127-00 Photoelectric Effect Apparatus

Variable voltage
output: $-15 \text{ V} - +15 \text{ V}$



Order Information

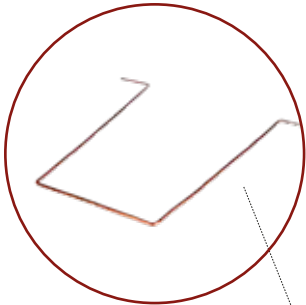
Item Code	Item Name
EE-0127-00	Photoelectric Effect Apparatus
EE-0128-00.....	Light Source Box with Photo Tube
EE-0120-05.....	Connection Cables (50 cm, 4 Pcs)
EE-0033-00.....	Multimeter (2 Pcs) (required, not included)

LORENTZ FORCE

REEE10

Description

Study the magnetic force on a current carrying wire and bar immersed in a magnetic field.

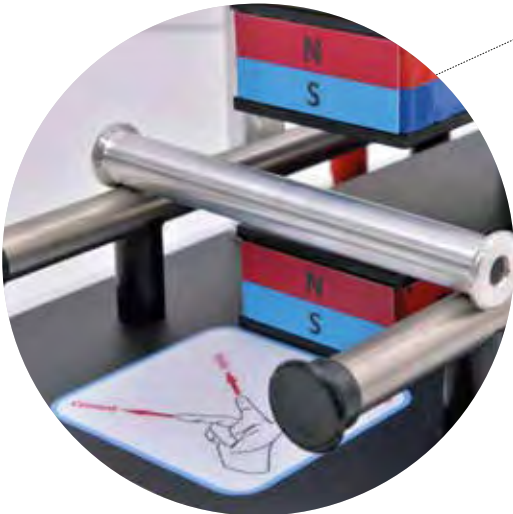


- EE-0121-00 Conductive Wire**
- Material Type: Copper
 - Length: 7 cm
 - Height: 13 cm



Current is sent through wire immersed in a uniform magnetic field, generating a Magnetic Force on the wire. For different currents the angle of the wire is measured.

Experiment can be performed instead with a conductive, movable cylindrical bar. Current is applied the bar, inducing motion hence electromotive force.

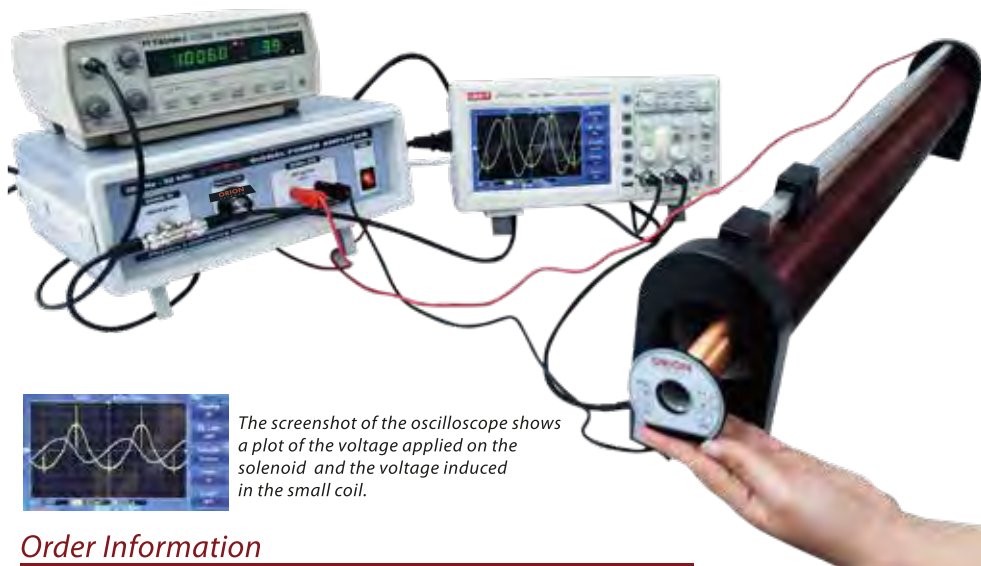


Order Information

Item Code	Item Name
EE-0006-00.....	DC Current Source 220 V
ST-0075-00	Lorentz Force Experiment Base (with Angle Scale , Magnets , Conductive Cylinders and Support Rods)....
EE-0121-00	Conductive Wire
EE-0122-00	Conductive Bar
EE-0120-05	Connection Cables (50 cm, 2 Pcs)

MAGNETIC INDUCTION

REEE06



The screenshot of the oscilloscope shows a plot of the voltage applied on the solenoid and the voltage induced in the small coil.

Description

Faraday Induction Law is verified, by applying a voltage to the solenoid and oscilloscope measures induced voltage on small coils.



Coils

- EE-0155-00 : 75 turns
- EE-0156-00 : 150 turns
- EE-0157-00 : 300 turns

Order Information

Item Code	Item Name
EE-0052-00.....	Power Amplifier
EE-0055-00.....	Solenoid
EE-0155-00.....	75 Turn Coil
EE-0156-00.....	150 Turn Coil
EE-0157-00.....	300 Turn Coil
EE-0151-00.....	Double Sided BNC Cables (2 Pcs)
EE-0151-01.....	BNC-Banana Cables (2 Pcs)
EE-0007-00.....	BNC T Connector
EE-0120-09.....	Connection Cables (90 cm, 4 Pcs)
EE-0034-00.....	Function Generator (required, not included)
EE-0032-00.....	Oscilloscope (required, not included)
EE-0033-00.....	Multimeter (required, not included)



Adjustable coil length

Solenoid

- 280 turns
- Length: 750 mm
- Diameter: 81 mm

MAGNETIC INDUCTION – VERNIER VERSION

REEE06-V **NEW**

Description

The signal from LabQuest 2 (signal generator) is amplified by Vernier Power Amplifier (PAMP). The datas are read from LabQuest® 2 screen



Required Units

Differential Voltage Probe DVP-BTA	Current Probe DCP-BTA	LabQuest® 2 LABQ2	Vernier Power Amplifier PAMP
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- EE-0052-00 Power Amplifier
 - EE-0034-00 Function Generator
 - EE-0032-00 Oscilloscope
 - EE-0033-00 Multimeter
 - EE-0151-00 Double Sided BNC Cables
 - EE-0151-01 BNC-Banana Cables
 - EE-0007-00 BNC T Connector
- are not required in this version



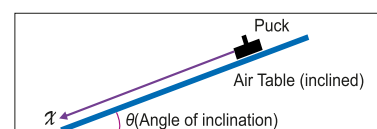
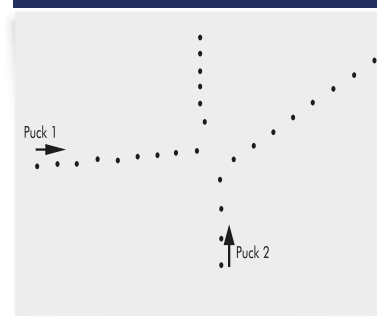
Description

By measuring the distance of dots produced by spark timer, motion and collision experiments can be performed accurately in a 2D environment with extremely low friction. With Air Table:

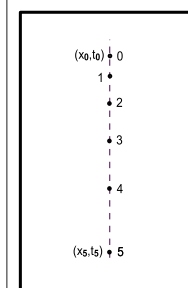
- Elastic collision,
 - Inelastic collision,
 - Atwood machine,
 - Inclined plane,
 - Projectile motion
- experiments can be done

AIR TABLE REME02

Elastic Collision of Two Pucks



The set-up for a puck moving down an inclined air table.



The dots produced by the puck on the data sheet for an inclined air table.

Included Accessories

Pucks		Additional Weights	
		142 g, 2 Pcs	
Pulley Set		Rotation Apparatus	
2 pcs for Atwood Machine experiment		angular velocity and momentum apparatus	
Launcher		White and Carbon Paper	
for projectile motion experiment			
Angle Protractor		Velcro	
is used at inclined plane experiment		for inelastic collision	

Order Information

Item Code	Item Name
ST-0003-00	Air Table Glass Base
EE-0004-01	Compressor
EE-0005-00	Spark Timer
ST-0004-00	Air and Voltage Distributor
ST-0005-00	Test White Data Paper (500 Pcs)
ST-0006-00	Conductive Carbon Paper (2 Pcs)
ME-0014-00	Angle Protractor
ME-0003-00	Rotation Apparatus (with Rope)
ME-0015-00	Pulley Set (2 Pcs)
ST-0034-00	Hose
ST-0010-00	Height Block
ME-0016-00	Launcher
ST-0014-00	Metal Disc Weights (2 Pcs)
ST-0015-00	Experiment Puck
ST-0035-00	Velcro
EE-0031-00	Pedals (2 Pcs)
ST-0047-00	75cm String with Two Loops

Description

Nearly frictionless air track allows you to investigate the laws of motion and collisions in one dimension by using Vernier Photogates or Motion Detectors and LabQuest® 2 interface

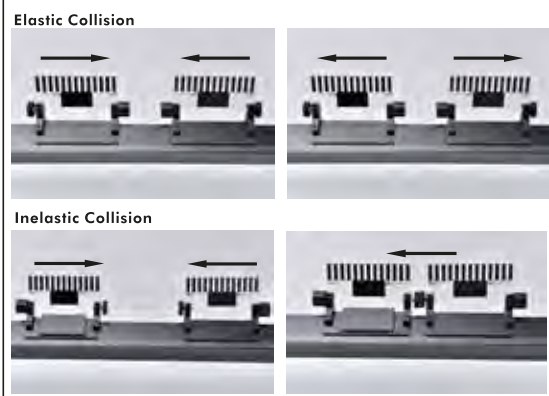


ST-0101-00 Air Track
• Length: 1.4 m
• Metric Scale
• 70x2 Holes
• Material Type: Aluminium

Adjustable Legs

ST-0103-00 Bumper

AIR TRACK REME03-V



Included Accessories

Vernier Cart Picket Fence	Collision Components
 to detect gliders velocity per second	 has same pole of magnet for elastic collision experiment (2 pieces)
Mass Set	Height Block
	 for inclined plane experiment
Additional Mass	Tack
	 to cling carts together (for inelastic collisions)
Rubber Band	Low Frictionless Pulley
	 to transfer force from mass to gliders

Order Information

Item Code	Item Name
ST-0101-00	Air Track
ST-0104-00	Mass Set
ME-0021-00	Low Frictionless Pulley
ST-0102-00	Carts (2 pcs)
ST-0102-01	Collision Components (2 Pcs)
ST-0102-03	Screws for Carts (4 Pcs)
ST-0102-04	Additional Mass for Gliders
ST-0010-00	Height Block
ST-0103-00	Bumpers (2 Pcs)
ST-0183-00	Photogate Holders (2 Pcs)
ST-0110-00	Adjustable Legs (2 Pcs, with 3 Screws)
ME-0014-00	Angle Protractor
ST-0102-05	Tack
EE-0004-00	Compressor
ST-0207-00	Hose for Compressor
VPG-BTD	Vernier Photogate (2 Pcs) (required, not included)
PF-CART	Cart Picket Fence (required, not included)
LABQ2	LabQuest® 2 (required, not included)

AIR TRACK WITH VERNIER MOTION DETECTOR



Position versus time graph of a cart at inclined plane experiment.

Additional Units

Detector Plates	Vernier Motion Detector Holder	Vernier Motion Detector
		

Vernier Photogates and Holders are not included in this version

Description

Angular Velocity and Acceleration experiment is designed for a complete study of the rotational motion laws. It lets to perform a variety of experiments in rotational mechanics including;

- Angular velocity,
- Angular acceleration,
- Torque,
- Moment of inertia,
- Conservation of angular momentum



ST-0056-00 Metal base
with leveling screws (3 Pcs) to balance base

Optical Detector



EE-0061-00 Pulse Counter
Pulse counter (digital display) counts the numbers of bars of each disk at the same time



ME-0007-00 Frictionless Wheel
The force in the string over the frictionless wheel causes a torque on the disks and they start to rotate

ANGULAR VELOCITY AND ACCELERATION REME12

Metal Disks



ST-0057-00 Stainless Steel Disks

- 1360 g, 2 Pieces, with 200 bar strip

ST-0058-00 Aluminium Disk

- 466 g, 1 Piece, with 200 bar strip

Under applied air flow, the disks can rotate together or independently from each other.

Mass Set with Torque Pulley



Torque Pulleys

for moment of inertia experiment



Spirit Level

to balance the base correctly



Plugs

to control air flow



Order Information

Item Code	Item Name
ST-0056-00	Experiment Base.....
ST-0057-00	Stainless Steel Disks (2 Pcs).....
ST-0058-00	Aluminium Disk.....
EE-0061-00	Pulse Counter.....
ME-0007-00	Frictionless Wheel.....
ME-0012-00	54.2 mm diameter Torque Pulley.....
ME-0006-00	28.5 mm diameter Torque Pulley.....
ME-0007-00	Frictionless Wheel.....
ST-0060-00	Plug (51 mm)
ST-0061-00	Plug (38.5 mm).....
ST-0026-00	Plug (28 mm, Aluminium).....
ST-0027-00	Plug (28 mm, Brass).....
ST-0033-00	Plug (19.5 mm).....
ST-0104-00	Mass Set with Torque Pulley
ST-0059-00	Spirit Level.....
EE-0004-01	Compressor.....

COMPUTER AIDED Optional



The moment of inertia of two disks experiment

GYROSCOPE

REME25-V

Description

This apparatus allows to explore rotational, precession and nutation motions experimentally. The gyroscope consists of a disk which can be rotated by hand. The angular speed of the disk, the precession rate of the gyroscope and gyroscope's nutation angle are measured by using Vernier Rotary Motion Sensors.



Rotational Motion

ST-0200-00 Gyroscope Disk

- Can rotate in two direction
- Mass: 2 kg
- Diameter: 26 cm



■ Angular velocity of rotational motion (ω_R) of Gyroscope disk is measured by 1st Vernier Rotary Motion Sensor



■ Angular velocity of precessional motion (ω_P) of Gyroscope disk is measured by 2nd Vernier Rotary Motion Sensor



■ Angular velocity of nutational motion (ω_N) of Gyroscope disk is measured by 3rd Vernier Rotary Motion Sensor



ST-0198-00 Balance Mass Set

- 2 Pcs
- 40 g, 900 g

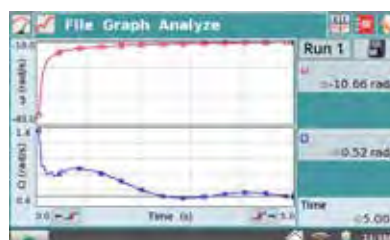


ST-0199-00 Mass Set

Image of the mass set, showing a small weight hanging from a string.

Order Information

Item Code	Item Name
ST-0195-00	Metal Base
ST-0200-00	Gyroscope Disk
ST-0198-00	Balance Mass Set (2 pcs)
ST-0196-00	Angle Scale
ST-0197-00	Sensor Holder
ST-0199-00	Mass Set
RMV-BTD	Rotary Motion Sensor (3 pcs) (assembled to set)
LABQ2	LabQuest® 2 (required, not included)



Angular velocity of the disk and precession rate of gyroscope

PROJECTILE MOTION AND BALLISTIC
PENDULUM

REME06

Description

Study projectile motion and conservation of momentum and kinetic energy loss through the ballistic pendulum.



EE-0024-00 Photogate



ME-0009-01 Projectile Motion Unit (with metal base)



ME-0009-02 Ballistic Pendulum Unit



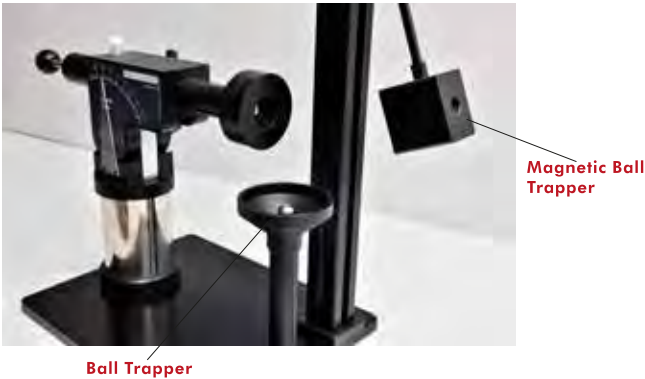
EE-0025-00 Orion Timer
Shows flight time and initial velocity of steel ball



EE-0027-00 Sensor Plate

Order Information

Item Code	Item Name
ME-0009-01	Projectile Motion Unit (Launcher with Metal Base).....
ME-0009-02	Ballistic Pendulum Unit (with Support Rod, Pendulum Rod with Magnetic Scale, Angle Scale and Indicator).....
EE-0027-00	Sensor Plate
EE-0025-00	Orion Timer
EE-0024-00	Photogate
ST-0187-00	Pendulum Rod Holder
ST-0028-00	Steel Balls (3 pcs)
ST-0029-00	Copy Papers (10 Pcs)
ST-0030-00	White Papers (10 Pcs)
ST-0186-00	Ball Trapper
EE-0029-00	Communication Cables (2 Pcs)
GGL-VPL	Vernier Googles (required, not included)



TORSION REME14

Description

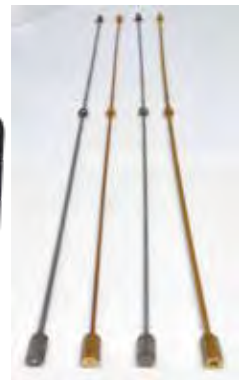
Torsion constant of different metal rods can be determined. Length of the rods can be changed. Different diameter of same type of metal rods can be used in torsion experiment.



ST-0188-00 Mass Set

- 7 Pcs
- 50 g, 100 g, 200 g, 500 g

Depending on the mass used, rod attachment rotates the metal rod. The torsion angle is observed from the angle scale.



ST-0189-00 Metal Rods

- 4 Pcs
- Material Type: Brass and Stainless Steel
- Diameter: 3 mm, 4 mm



Torsion angle of half length of metal rods can also be calculated by fixing the screw on length adjustment mechanism.



Torsion angle of brass and stainless steel rods

Order Information

Item Code	Item Name
ME-0017-00.....	Torsion apparatus (Angle scale, Angle indicator Rod attachment, Length adjustment mechanism, Support bars).....
ST-0188-00	Mass Set for Torsion (500 g x3, 200 g x2, 100 g, 50 g).....
ST-0189-00	Metal Rods.....

Orion Timer EE-0025-00

- 4.3 inch digital screen
- TFT touch screen
- 0.001 accuracy
- 10 experiments memory
- Adaptable to Air Track and Projectile Motion - Ballistic Pendulum experiments



Description

This experiment is designed to to verify the law of conservation of mechanical energy in a system with gravitational potential energy, translational kinetic energy and rotational kinetic energy.



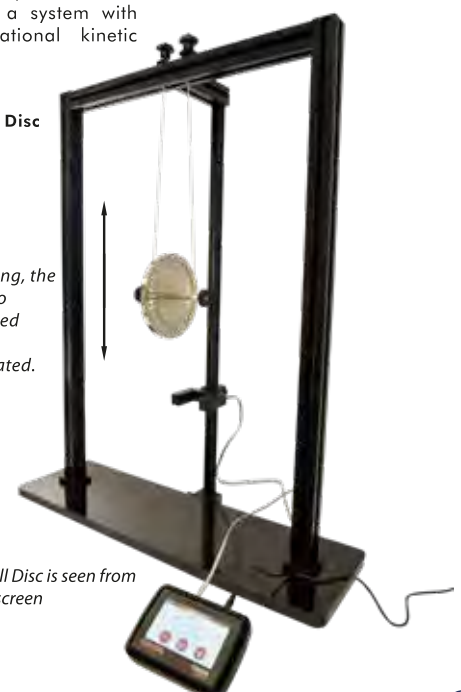
ME-0035-00 Maxwell Disc

- Weight: 108 g
- Diameter: 150 mm
- Number of Holes: 36



SN-0004-00 Photogate

While Maxwell Disc rotating, the time interval between two unblocked case is measured with photogate and the angular velocity is calculated.



Period of Maxwell Disc is seen from the Orion Timer screen

Order Information

Item Code	Item Name
ST-0223-00	Maxwell Experiment Platform.....
ME-0035-00.....	Maxwell Disc
EE-0025-00	Orion Timer.....
SN-0004-00.....	Photogate
ST-0224-00	Ropes (2 Pcs).....
EE-0135-00	Communication Cable

RESONANCE TUBE

REDS01-V

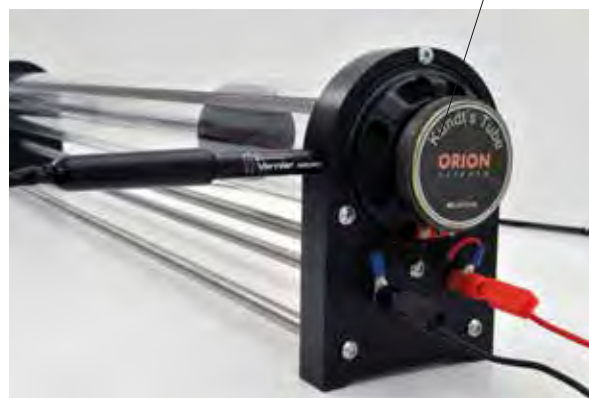
Description

In this experiment, students can investigate standing sound waves in a column of air inside a resonance tube and measure the speed of sound in air by using the standing waves produced at the resonant frequencies.



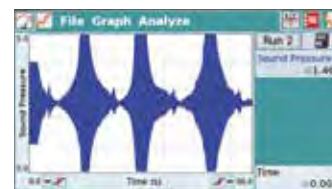
The piston is moved slowly to obtain maximum acoustic amplitude (resonance). The distance between two adjacent anti-nodes is read from the ruler on the resonance tube. Thus, the acoustic wavelength within the tube can be measured and calculated..

Speaker



The signal originated the LabQuest® 2 signal generator is detected with the Vernier Microphone and amplified by the Vernier PAMP. Data is collected and processed in LabQuest® 2.

Required Units



The screenshot of LabQuest® 2 screen in resonance condition

Order Information

Item Code	Item Name
ME-0018-00.....	Resonance Acrylic Tube (with Speaker and Ruler, Piston, Rod, Support Bars).....
MCA-BTA	Vernier Microphone (required, not included).....
PAMP.....	Vernier Power Amplifier (required, not included)
LABQ2	LabQuest® 2 (required, not included).....

IDEAL GAS LAW

RETE06-V

Description

The objective of this experiment is to measure the pressure of an ideal gas with respect to its temperature, analyze the relation between volume and pressure of the gas, investigate the change in volume of the gas of the gas depending on its temperature and calculate the universal gas constant experimentally. By changing the volume and the temperature of gas in a glass tube, the student can explore:

- Gay-Lussac's Law
- Boyle's Law
- Charles Law can be verified



CH-0010-00 Cylindrical Water Jacket
 ■ Material Type: Glass and Hard PLastic
 ■ Diameter: 12 cm

Hot water in Cylindrical Water Jacket heats the air in Gas Syringe



Gas Syringe
 ■ Material: Glass
 ■ Max 100 ml scaled



EE-0110-00 Heater and Pump Control Unit
 ■ Temperature Control
 ■ Maximum Temperature 70°C

This device is used to heat water in the Water Reservoir and pump water to the Cylindrical Water Jacket.



Water Pump

Heater Resistance

Required Units

LabQuest® 2
LABQ2



Vernier Gas Pressure Sensor
GPS-BTA



Vernier Temperature Sensor
TMP-BTA



Order Information

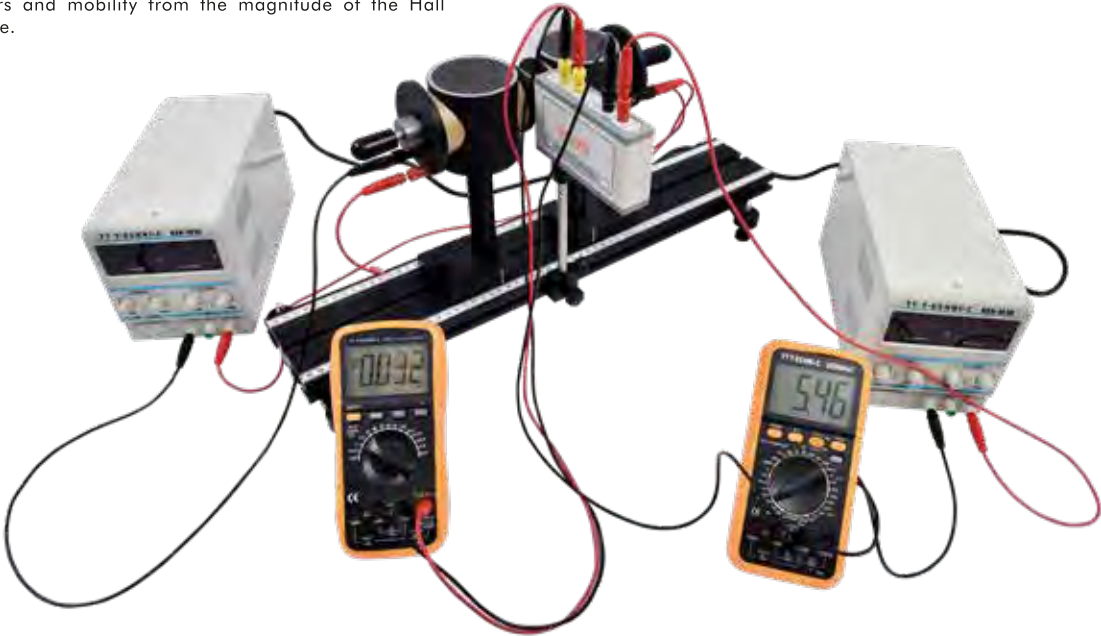
Item Code	Item Name
EE-0110-00.....	Heater and Pump Control Unit.....
CH-0009-00.....	Water Reservoir
CH-0010-00.....	Cylindrical Water Jacket.....
CH-0011-00.....	Volume Controlled Gas Syringe
CH-0012-00.....	Hose (3 pcs).....
TMP-BTA.....	Vernier Temperature Probe (assembled)
GPS-BTA.....	Vernier Pressure Sensor (assembled).....
LABQ2.....	LabQuest® 2 (required, not included).....

HALL EFFECT

REMA02

Description

This experiment is designed to explore the Hall Effect and Hall voltage of a n-type germanium sample, the Hall coefficient, as well as the concentration of charge carriers and mobility from the magnitude of the Hall voltage.



EE-0160-00 Hall Effect Apparatus
Controlled voltage is applied to germanium crystal.
Hall voltage is measured by multimeter.



EE-0161-00 Solenoids
The magnetic field on the germanium semiconductor is changed by the current supplied to the solenoids.

Order Information

Item Code	Item Name
EE-0160-00.....	Hall Effect Apparatus (with Germanium Crystal).....
EE-0161-00	Electromagnets (2 Pcs) (Solenoids, Iron Core, with Holders)
ST-0175-00	Bench (60 cm) (with adjustable legs).....
EE-0033-00	Multimeter (2 pcs) (required, not included)
EE-0120-08	Connection Cables (80 cm, 8 Pcs).....



ORION

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