Ontario Association of Physics Teachers

NEWSLETTER

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Richard E Taylor-Co-recipient of the 1990 Nobel Prize in Physics

RICHARD E. TAYLOR was born on November 2nd, 1929 in Medicine Hat, Alberta. He studied Physics at the University of Alberta in Edmonton, where he received the B.Sc. degree in 1950 and the M.Sc. degree in 1952. He went for graduate studies to Stanford University, where he received a Ph.D. During his graduate work he spent three years at the Ecole Normale Superieure in Paris working on the building of the linear accelerator at Orsay. He returned to California, where he worked in Berkeley and Stanford, helping build the linear accelerator at Stanford, and especially the detectors to be used in experiments with this accelerator.

At Stanford he became head of an experimental team which studied in 1967-68 the inelastic scattering of high energy electrons from protons and neutrons. The study of these scattered electrons suggested a substructure of much smaller particles within the protons and neutron. These small particles came to be identified with the "quarks" of Gell-Mann and Zweig. Following this landmark experiment, his group also conducted a very important electron scattering experiment, which showed that a basic mirror symmetry of nature is violated in these interactions.

R.E. Taylor is a Professor at Stanford University and is involved at the moment in experiments conducted at a new machine (HERA) in Hamburg, Germany. Professor Taylor is a Fellow of the Royal Society of Canada, recipient of an honorary doctorate from the University of Paris, and recipient of the Panofsky prize of the American Physical Society

by Gabriel Karl, Dept. of Physics, University of Guelph

June Conference

The calender which accompanies this newsletter reminds us that the annual OAPT contest conference will be held at Queen's University in Kingston, June 23-25, 1991. Details will be available in the March newsletter. However, if you need to make early application for funding, assume that the total cost will be less than $200. This will include conference registration, Sunday workshop, accommodation for two nights, meals, tours and dinner cruise.

OAPT Contest

This year's OAPT contest for Grade 12 physics students will be held on Tuesday, May 7. The contest committee is composed of the following people:

Peter Scovil----------Waterford District H.S.
Malcolm Coutts-------Riverdale C.I., Toronto
Chris Howes----------Pickering High School
Don Murphy---------Sydenham High School
Dianne Ness----------Humberside C.I., Toronto
Ron Taylor-----------Woburn C.I., Scarborough

Grade 12 physics teachers are asked to promote the contest by giving out copies of previous papers, especially to students who take physics in the first semester. Interested students from the first semester could be contacted during April and reminded of the contest.

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Membership Due?

The date on your address label is the expiry date for your membership. If it says June 90, your membership has aleady expired. You may use the coupon below to renew it.

Membership Application and/or Renewal

Name____________________________

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$8.00 per year, payable to the OAPT

Send to: Professor Ernie McFarland,
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THE DEMONSTRATION CORNER

THE WORLD'S SIMPLEST MOTOR

by
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Ed. note: This article has been excerpted, with permission, from a delightful 225-pg. book on physics demonstrations, ***Turning the World Inside Out***, by Robert Ehrlich. This book (ISBN 0-691-02395-6) is a treasure-trove of good, inexpensive demonstrations. You can order it through your favourite bookstore or, while supplies last, at a 20% discount directly from the author. (Send a cheque for $13 (U.S.) payable to "GMU Foundation: Physics Teaching Fund".)

Demonstration

The world's simplest motor can be constructed in less than five minutes.

Equipment

A "D"-size 1.5 V battery; a small disk-shaped magnet; some wire; and a thick rubber band.

Construction

You need to make a small field coil (the rotating part of the motor) and two supports in which to place the ends of the field coil. Make the field coil of the magnet by winding 10 turns of varnish-coated noninsulated number-22 wire. Make the ends of the wires that extend from the field coil into hook shapes, as shown in the illustration. Scrape the varnish off the *top half* of the two wire ends. Shape two paper clips (or some stiff noninsulated wire) into two rigid supports that have small loops at the top. With a strong rubber band, hold the two supports fixed against the two ends of the battery. Insert the hook-shaped wires coming out of the field coil into the loops at the tops of the two rigid supports, so that the field coil lies just above the disk-shaped magnet, which is placed atop the battery at its middle. Current flows through the field coil as long as its ends are in electrical contact with the supports.

Comment

If you give the field coil a little push, it should keep spinning for a while. The motor doesn't require split rings or a commutator because the field-coil wires make electrical contact with the loops during only half of the cycle, and the coil's rotational inertia carries it through the other half of the cycle. The motor can be held sideways on an overhead projector and shown to a large group. Take the field coil off when you're done so you don't run the battery down completely, since the field-coil resistance is very small. For more details on this ingenious demonstration, see the following two articles in *The Physics Teacher (TPT)*: Rudy Keil, *TPT 17*, 308 (1985), and Scott Welby, *TPT 23*, 172 (1985).

There are other devices that can also lay claim to being the world's simplest motor. Among them is "Top Secret", made by Andres Manufacturing Company, Inc. of Eugene, Oregon, and sold in novelty stores. This intriguing device consists of a small top that can be given a spin on a platform that comes with the top. An initial spin causes the top to spin for days. The device is actually a motor. It has a battery-powered transistor and coil in its base that provide an alternating magnetic field, and there is a permanent magnet inside the top. The spinning magnet top induces a small current in the coil which the transistor amplifies. The magnetic field produced by the amplified current attracts (and accelerates) the spinning magnet top, thereby offsetting frictional losses.

Column Editor: Ernie McFarland, Physics Dept., University of Guelph, Guelph, Ontario, N1G 2W1

Submissions describing demonstrations will be gladly received by the column editor.