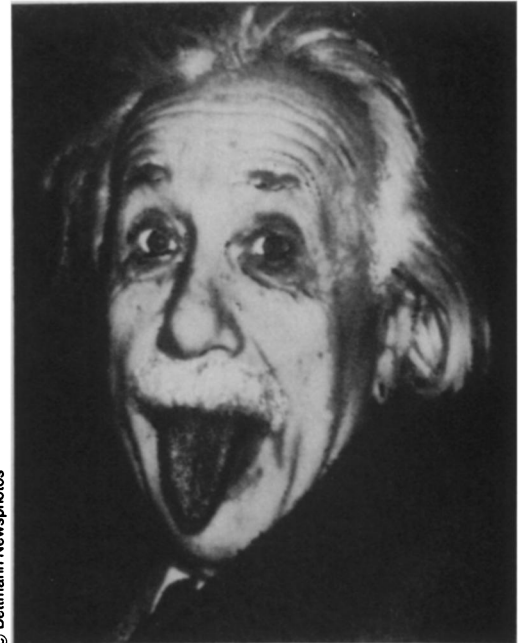


Gravity Refracts

A gravitational lens effect can occur if a black hole, a galaxy or a cluster of galaxies lies between earth and some distant object. The gravity of the black hole or cluster will refract the light from the distant object, multiplying and distorting its image. To show astronomers what to look for, Emilio E. Falco of Massachusetts Institute of Technology and Michael J. Kurtz and Matthew H. Schneps of the Smithsonian Astrophysical Observatory Image Processing Laboratory developed a computer program that simulates gravitational lensing of astronomical objects.



© Bettmann Newsphotos

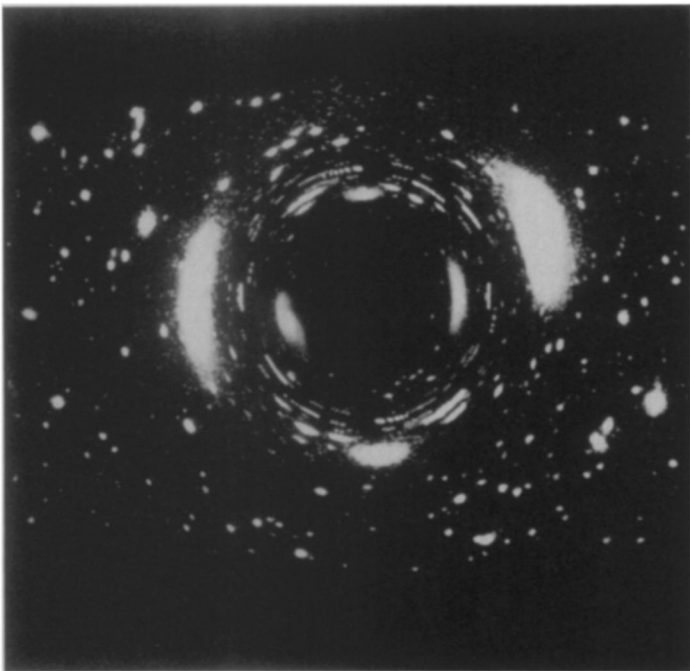
This is Einstein in the absence of black holes. See front cover for the same view refracted.



Smithsonian Astrophysical Observatory-IPL

Right: A single galaxy in the foreground would double and distort the image of a more distant galaxy. The galaxy being lensed here is NGC 3992. Above: A cluster of galaxies lensed by a single foreground galaxy. For other views of the cluster see page 62.





Here the same galaxy cluster is imaged by a black hole in the foreground (above). As in Einstein's case (cover) the center of the image is dark and empty. The darkness is not a picture of the black hole; it is an artifact of the black hole's strong gravity. The weaker gravity of the foreground galaxy hardly clears out the center of the image at all (p. 61), but both images show a pronounced circularity. The cluster unrefracted appears at right.

Bind and Save your copies of **Science News**

Keep your copies of SCIENCE NEWS always available for quick, easy reference in this attractive, practical binder.

Simply snap the magazine in or out in a few seconds — no punching or mutilating. It opens *flat* — for easy reference and readability. Sturdily constructed, this blue vinyl binder stamped in a gold tone will make a fine addition to your library.

SCIENCE NEWS binders hold one six-month volume of SCIENCE NEWS. Each of the 26 issues snaps into the cover with a metal rod. \$8.00 each, 2 for \$15.00. Postage-paid.

Order now, from

Science News
1719 N Street N.W.
Washington, D.C. 20036

FROM FALLING BODIES TO RADIO WAVES

Classical Physicists and Their Discoveries

EMILIO SEGRÈ

This chronicle of physics and physicists traces the development of scientific thought from the works of the "founding fathers" — Galileo, Huygens and Newton — to the more recent discoveries of Maxwell, Boltzmann and Gibbs. Combining his own engaging style with the original writings of the physicists themselves, Segrè shows us the evolution not only of physical ideas, but of the subject itself as new experiments led to new problems.

Science News Book Order Service

1719 N Street, N.W.
Washington, D.C. 20036

Please send _____ copy(ies) of **From Falling Bodies to Radio Waves**. I include a check, payable to Science News Book Order Service, for \$13.95 plus \$1.00 handling (total \$14.95) for each copy. Domestic orders only.

name _____

address _____

city _____

state _____

zip _____

RB403

W. H. Freeman and Company, 1984, 298 pages, 6" x 9", paperback, \$13.95.