ASTRONOMY

Rings Around Double Stars

Discovery of gaseous rings surrounding some suns may bring us closer to solving the riddle of how multiple stars and dark planets are created.

By DR. OTTO STRUVE

Director, Yerkes and McDonald Observatories

➤ MANY double stars, those enormous suns that whirl around each other at incredible speeds, are surrounded by rings of flaming gases. Discovery within the past few weeks of several new double stars of this type may bring us closer to solving the riddle of how multiple stars and dark planets are created. One or both of the rotating suns in double stars such as AQ Pegasi, in the constellation of Pegasus, the Winged Horse, and VW Cygni, in the constellation of the Swan, are encircled by tenuous rings of fiery gases. Half-a-dozen such stars have recently been found by observers at the McDonald Observatory of the University of Texas, operated jointly by the Universities of Texas, Chicago and Indiana.

In all the twin stars with rings thus far observed, the flaming rings of gases have been found to rotate very rapidly in the direction in which the two suns themselves revolve. Since the component stars at present do not rotate exceptionally rapidly around their axes, it seems probable that the rings, which move much more rapidly, were formed early in the history of each system.

These rings, which might be compared to the rings surrounding the planet Saturn, were probably created when the rotation of the star was great enough to make the system unstable. They possibly came into being at the time the star split to form a two-star system.

Usually the thin rings, with diameters two or three times the diameters of the stars themselves, are located midway between the two poles, in the equatorial plane of the rotating star. In most cases the presence of these rings, far too small to be seen even with the largest telescope, is detected by bright radiations of hydrogen and sometimes of other gases found in the star's spectrum.

Once in a while we find a star whose equator happens to lie exactly in the line of our sight so we get an edge-on view of the ring. In such a case we observe the light of the star shining through the gases composing the ring. This makes it possible to learn some of the secrets of these Saturn-like stars by examining the dark lines which appear in the spectrum.

Thinking of the rings of Saturn may make clearer the way we study these stars. When the rings are open, they are seen projected mostly upon the background of the sky. If the rings were gaseous (which the rings of Saturn are not) they would then give bright lines in the spectrum. But sometimes the rings of Saturn are seen edgewise, and are then mostly projected upon the disk of the planet. In such a position a ring of gas would produce in the spectrum dark lines in the position characteristic of the bright lines belonging to the gas.

Some of the close binary systems consist of two suns revolving around one another, almost in contact, taking from a few hours to many days to complete one rotation. Frequently these double stars are surrounded by tenuous rings, while sometimes only one of the two revolving suns has a ring around it.

When the ring surrounds only one sun in a binary system, we have a good opportunity to test our theory concerning these gaseous rings. Once in every revolution the star in front eclipses the star behind it. But just before the more distant star is hidden, the star in front passes over one side of the ring and eclipses it. Immediately after the eclipse it covers up the other side of the ring. When one or the other side of the ring is eclipsed, the violet and red components of the bright lines of hydrogen disappear from the spectrum.

The use of the spectograph in detecting the presence of rings was suggested by the late Dr. Arthur B. Wyse of the Lick Observatory and was then correctly interpreted by Dr. Alfred H. Joy of the Mount Wilson Observatory.

In the course of some ten years we have observed the appearance of new rings around single, rapidly-rotating stars, and have also seen the rings gradually disappear. They seem to be quite unstable and rapidly dissolve into space.

It seems probable that these rings, only rarely present in single stars, are frequently present in two-star systems. Even when we do not see them, they are almost certainly present because in most of the systems the angle at which we see the rings is not suitable for producing and observing the bright lines in the spectrum.

Science News Letter, November 17, 1945

A *fuel* somewhere between kerosene and gasoline has been developed for jet-propelled planes.

The *coco palm* provides food, drink, clothing and shelter; from the coconut shell, combs, spoons, bowls and ornaments are made.

SCIENCE NEWS LETTER

Vol. 48 **NOVEMBER 17, 1945** *No. 20*

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St. N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents. Monthly Overseas Edition: By first class mail to members of the U. S. Armed forces, $1.25 a year. To others outside continental U. S. and Canada by first class mail where letter postage is 3 cents, $1.25; where letter postage is 5 cents $1.50; by airmail, $1.00 plus 12 times the half-ounce airmail rates from U. S. to destination.

Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.