PHYSICS

Mesotron Is Shortest-Lived Thing in Whole Universe

New Extension of Life Span Still Leaves It With Only 2.8 Millionths of a Second; Born in High Air

THE LIFE of the mesotron, middleweight atomic fragment, is probably the shortest span of existence in the universe, despite new measurements, reported to the American Physical Society in Baltimore which have given it quite a boost. Experiments carried out at Echo Lake and at Denver, Colo., last year gave it a life of 1.6 millionths of a second, in substantial agreement with previous estimates. New and more accurate measurements this year give it a life of 2.8 millionths of a second.

The experiments were made by Drs. Bruno Rossi and Kenneth Greisen of Cornell University, Drs. Joyce C. Stearns and Darol K. Froman of the University of Denver and Dr. Phillip G. Koontz of Colorado State College.

Mesotrons are born high in the atmosphere through some action of the incoming cosmic rays. But few of them live to reach the earth. In fact, many of them expire in passing from the level of Echo Lake to the level of Denver, a drop of about 5,000 feet.

However, the new experiments confirmed what was previously found, that the faster the mesotron travels, the longer it lives—as measured in our time. But measured in its own time, mesotron time, all have about the same life span, 2.8 millionths of a second. This is called the "proper" lifetime of the mesotron, and is obtained from the experimental times by correcting them for the relativity effect of velocity on time.

Thus for a mesotron a fast life means a long life, contrary to the case for human beings. But if you were a fast-moving mesotron you would know nothing about this. Consulting your own watch—a perfect timepiece—you would find that you lived not a whit longer than if you stood stock still—2.8 millionths of a second in either case.

But observers on the earth, consulting their own timepieces—also perfect—would find that your watch was ticking more slowly—also that your little heart was ticking more slowly.

And if, doubting your own watch, you stopped to compare it with that of one of the observers, you would find both going at exactly the same rate. Thus, by your own heart beats, your "proper life" is always the same whether you travel or stand still, supposing you're a mesotron.

Science News Letter, May 9, 1942

Grating Made in Sections

A DIFFRACTION grating that distinguishes between a new star and a planetary nebula was described by Dr. R. W. Wood of the Johns Hopkins University. The grating, 18 inches in diameter, has been made to fit the 18-inch Schmidt photographic telescope at Mt. Palomar, California, where the 200-inch telescope, the world's largest, is to be located. The grating throws a rainbow spectrum like a spectroscope, and shows a nitrogen band for the nebula very near the bright hydrogen line. This band is not seen with an objective prism.

The whole surface of the 18-inch disk is covered with straight parallel grooves or lines, accurately spaced and 1,500 to the inch. The grooves are so shaped that nearly all of the light is thrown into the spectrum and the highest intensity is in the red region.

A novel feature of this grating is that it is built up in sections like a mosaic. These sections measure 4 x 6 inches and are replicas of one master grating.

The grating when placed over the object glass of the telescope, draws out into a spectral streak every object in the field of the telescope.

Another 18-inch grating has been made with but 800 lines to the inch in order to give short spectra; this is required when the field is crowded with many stars, for otherwise the spectra overlap. This grating throws most of the light in the blue end of the spectrum, and will be used for classifying faint stars according to their spectra.

Dr. Wood is to make a 36-inch grating for the Mount Wilson Observatory.

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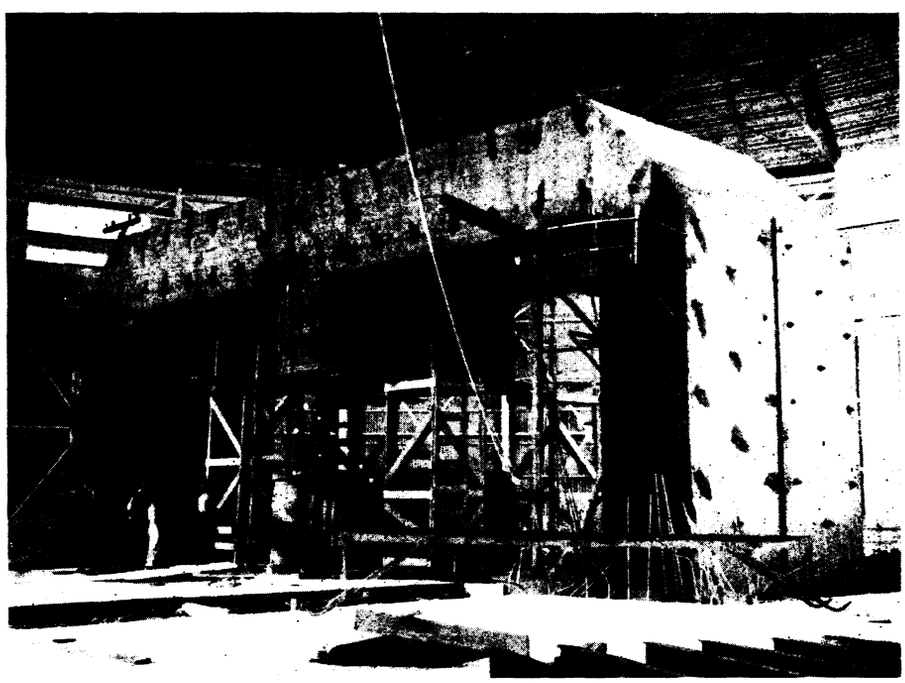
Berkeley 100,000,000-Volt Cyclotron Now Has Roof

FOR some time the great 100,000,000-volt cyclotron being constructed for the University of California has stood out in the open. Now it has a roof over its head. The heavy work of erecting the



GREATEST CYCLOTRON