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News Release

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RELEASE -- ADVANCE -- HOLD FOR WIRE STORY RELEASE FROM AGU-NASA, WASHINGTON, D. C. -- EXPECTED P. M. 'S (1330) TUESDAY, APRIL 19 --

LOW ENERGY COSMIC RAYS OBSERVED TO FORM "STREAMS" THROUGH THE INTERPLANETARY MEDIUM, REPORTS GRCSW EXPERIMENTER

WASHINGTON --

Low energy cosmic rays generated in solar flares stream through the solar system in well-defined "streams", the direction from which the streams come varying greatly from hour to hour. Within each "stream", the interplanetary magnetic field is much "smoother" than previously thought; any irregularities in the field must be of a dimension considerably greater than 50,000 miles.

These are the preliminary deductions from the data acquired by a major space experiment, as reported today by Prof. Kenneth G. McCracken, cosmic ray physicist from the Graduate Research Center of the Southwest in Dallas, Texas. Professor McCracken reported deductions drawn from data acquired during the first 20 days of flight of Pioneer VI, launched last December 16 by Ames Research Center, National Aeronautics and Space Administration.

Pioneer VI is in an orbit which will approach that of Venus at perihelion (closest point to the Sun). The spacecraft passed between Earth and Sun on March 6, moving from the evening to the morning side as related to the Earth.

The GRCSW experiment aboard Pioneer VI records the rate at which cosmic rays arrive at the spacecraft from four different directions in space. The purpose of the experiment is to determine whether the cosmic radiation is anisotropic; that is, whether the rates of arrival from the different directions are different from one another, and if so, to understand the manner in which the anisotropies have been generated. The GRCSW experiment records cosmic rays in the energy range of 7.5 million to 100 million electron volts.

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In the period from launch to January 1, said Prof. McCracken, the GRCSW detector recorded cosmic rays generated in three solar flares. On each occasion, he said, the cosmic radiation arriving at the spacecraft has been extremely anisotropic.

The anisotropic character has been retained for many hours, and, in one case, for a period of two days. Within these periods, the anisotropy has exhibited great fluctuations, suggesting that the direction from which the maximum flux of cosmic rays was arriving was varying by as much as 90^{o}. The persistence of the anisotropies, their "flapping" back and forth, and the sudden changes in cosmic ray intensity, were unexpected and indicates a considerable patchy-ness in the distribution of cosmic rays within the solar system. The data suggest that the cosmic rays are travelling in well defined "streams" through the interplanetary medium, and that the interplanetary magnetic field is quite "smooth".

The cosmic ray detector does not make direct magnetic field measurements, however, since cosmic radiation motion is totally dependent upon the configuration of the solar magnetic field, cosmic radiation data can be regarded a tool for mapping the interplanetary magnetic field.

Today's report was given at the "Symposium on Pioneer VI", an afternoon session of the American Geophysical Union meeting.

McC:pma --- 14/17P --- al mitchell --- 4/7/66 ---