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INTERNATIONAL CONFERENCE ON COSMIC RAYS AND THE EARTH STORM Part III

III-1-16. The Fragmentation of Heavy Nuclei in Light Elements

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A stack of 154 30 cm by 16 cm 600 μ Ilford G5 emulsions has been exposed for 10 hours at an altitude of $\sim$4 g/cm^2 over Texas. These emulsions were interleaved with 500 μ thick sheets of polythene and teflon. The purpose of the experiment is to study the characteristics of the nuclear interactions produced by the heavy, $Z \geq 3$, nuclei of the primary cosmic radiation as they pass through these sheets of plastic material. Those interactions in the teflon should resemble those produced in air, while the differences between the characteristics of the interactions in the two types of plastic should be indicative of the effects of hydrogen target nuclei.

At the present time, while preliminary data are available from this experiment, we do not feel that they are in a form suitable for publication since they might be subject to later revision. Instead we will merely give an estimate of the statistical weight of the data that should be available eventually. It is intended to detect 10^4 nuclei with $Z \geq 6$ which enter the stack. Of these we expect 30% to escape without interacting and of the remaining 7000, 4000 to interact in emulsion, 1800 in polythene and 1200 in teflon.

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III-1-17. Fragmentation Parameters Involved in the Collisions of the Heavy Nuclei of the Primary Cosmic Radiation of Charge $Z \geq 6$ in Graphite**

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§1. Introduction

The chemical composition of the cosmic radiation observed at balloon altitudes (3–20 g/cm^2 of air) depends primarily on the composition near the source region, the method of acceleration and its subsequent transformation during its passage through the interstellar matter and the overlying atmosphere above the point of detection. Therefore in order to infer the composition at the source region, it is necessary to know the parameters like interaction mean free path λ_i, absorption mean free path Λ_i and the fragmentation parameters P_{ij} for various groups of nuclei in interstellar medium (consisting essentially of hydrogen) and air (consisting mostly of nitrogen and oxygen). The data

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** This paper was read by R. R. Daniel.