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Progress Report to E. A. N. D. C. from Greece, January 1966

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1. Fast Neutron Spectrometer

A. Costikas, M. Dritsa,

A measurement of the total cross section of H_2O at 20°C and 200°C has been completed in the energy range 0.01 to 10 ev. The data are now being analyzed and evaluated with a careful consideration of possible sources of systematic errors. Preliminary calculations indicate that the cross section at 200°C differs from the cross section at 20°C by less that 0.5% in the energy region 0.05 to 10 ev. This result has been confirmed by measurements with the M.A.N. crystal spectrometer. A detailed account will be given in a forthcoming EANDC report.

2. Neutron and x-ray Diffraction

The study of the magnetic structure of Ga substituted Fe_3C_4 has been continued with the M.A.N. neutron crystal spectrometer. The results on the Curie temperature measurements has been published (Phys. Lett. 23, 31 (1966) (E. Gamari, S. Karavelas, H. Dachs*, P. Papamantellou).

The determination of the oxygen positions on Tl_2C_3 by neutron diffraction has been completed, and the results are under publication. (P. Papamantellou).

Neutron diffraction in nearly dislocation-free crystals of silicon is being compared with diffraction in mosaic (large dislocation density) metallic crystals. Interest is in effects similar to the x-ray dynamic diffraction phenomena observed only in nearly perfect crystals, and in the study of surface structure, and surface reflectivity effects useful for improvement of monochromator crystals. (A. Mc Reynolds*, S. Karavelas).

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3. Crystal Growth

K. Papathanassopoulos, A. Kypriotis

A systematic study has been started of the effect of pulling speed on mosaic spread of single crystals produced in the crystal growth lab. For this purpose 15 single crystals of Pb have been produced of dimensions 25x130mm and at various speeds. Measurements of the mosaic spread of these crystals by neutron diffraction are in progress.

4. Nuclear Physics

The Van de Graaff group has continued work on three body nuclear reactions. The reaction $^{10}B+D \longrightarrow \alpha+\alpha+\alpha$ has been studied and it was found that the mechanism of the reaction is predominantly sequential two-body decay while direct three-body decay if at all present is less than 10% of the total reaction output. It was also found that the cluster model describes successfully nuclei of atomic number $A \leq 12$. The results are contained in the following publications :

P. Assimakopoulos, N. Gangas. Sequential Decay in the Reaction $^{10}B+D \longrightarrow \alpha+\alpha+\alpha$, Zeits. f. Naturforschung 21a (1966).

P. Assimakopoulos, N. Gangas. Analysis of Three Body Reactions. Nucl. Instr. and Methods (in press).

P. Assimakopoulos, N. Gangas. The $^{10}B+D \longrightarrow \alpha+\alpha+\alpha$ Reaction. Nucl. Physics (in press).

Data obtained by one member of the group (G. Andritsopoulos) at Aldermaston on the fission of U^{235} have been evaluated. The results are contained in the following publications :

G. Andritsopoulos. Correlated Mass and Energy Distributions of Fission Fragments from U^{235} by Simultaneous Velocity and Energy Measurements. Nucl. Phys. (in press)

G. Andritsopoulos. Energy Dependence of Pulse Height Defect with Fission Fragments in a Silicon Surface Barrier Detector. Nucl. Instr. Meth. (in press).