Introduction

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The interaction of electro-magnetic radiation and nuclei takes place mainly in a relatively narrow energy, as a result of which the γ-quantum absorption cross-sections in various nuclei are exhibited clearly defined peaks, or giant resonances with a width of 4-8 Mev. The position of the absorption cross-section peak depends on the number of nucleons A in the nucleus. For light nuclei it occurs at 20-30 Mev, for medium nuclei at 17-19 Mev and for heavy ones at 13-15 Mev.

The nature of the giant resonance has been the subject of lively interest on the part of both experimentalists and theoreticians. A large number of experiments[(1)] have been carried out to determine the cross-sections of various photo-processes. Also, a great number of theories based on the concept of collective motions[(2)] and shell concepts[(3)] have been put forward to account for the findings, which in turn has given rise to prolonged discussion as to which model should be considered the most suitable for describing photo-nuclear reactions. In the discussions it was taken for granted, that the collective motion concept and the independent particles contradicted each other. In fact the development of the theory has shown that these two approaches are not so contradictory as they had appeared.

At present many of the investigations of this problem extend beyond a consideration of the nature of the giant resonance itself : now the point at issue is rather formation of different types of collective excitations of atomic nuclei and applicability of many-particle-shell model concept to describe highly excited nuclear states.

For a long time the energy position of the giant resonance as given by experiments contradicts with the predictions of Wilkinson's model[4]. This contradiction was solved by introducing the correlations between nucleons of the nucleus into this model. This leads by the way, to the understanding of the collective nature of the giant resonance.

At present time, the theory is faced with the following more complicated problems of the giant resonance :

1) The width and structure of the giant resonance,

2) The relation between the main branches of the photo-disentigration (γ , n) and (γ , p) ,

3) The energy spectrum of the photo-products and their angular distributions.

In this article an attempt has been made to study the structure of the giant resonance in Si^{28} nucleus.

The particle-hole (p-h) formalizm[5] of the shell model has become now a powerfull tool in the study the photo-disentigration problems. The absorption of a γ-quanta leads to the creation of a p-h pair or the annihilation of a p-h pair, initially present in the nucleus. Using Feynman's technique these processes are represented by the following diagrams :