

AN ANALYSIS OF THE DSA MEASUREMENTS AT LOW RECOILING VELOCITIES

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We have developed a new method for the analysis the Doppler-shift attenuation measurement, which is based on the assumption that the slowing down in the target material is a few step process ¹⁾. This assumption is well justified at low recoiling ($0.002c$) velocities where the nuclear stopping predominates over the electronic one. At such low recoiling velocities the shape of the shape of the DSA spectrum is influenced only by first few collisions. All other succeeding collisions have no influence since there is practically no more any excited nuclei. Even the contribution of those nuclei, which decay before being collided at all, is very high. Such a contribution is not involved in any calculation, based on continuous slowing down process.

We calculate the shapes and centroid shifts and compare them by the measured ones. The results are different from those obtained by Blaugrund ²⁾. It seems to us that this way will solve the problem of inconsistency between results obtained from (p, γ) and $(\alpha, n\gamma)$ reactions using the Blaugrund analysis ^{3,4)}. Namely, the preliminary measurements have been made, which confirm our theoretical conclusions, especially a different velocity dependence of centroid shifts.

1. M.Kregar, P.Kump, M.Pavšič, M.Vakselj, Nucl. Instr.Meth., 109 (1973) 109
2. A.E.Blaugrund, Nucl. Phys. 88 (1966) 501
3. S.T.Lam, A.E.Litherland, T.K.Alexander, Can. J.Phys., 47 (1969) 1372
4. F.C.P.Huang, D.K.McDaniels, Phys. Rev.C, 2 (1970) 1342