$^{19}F(p,\gamma)^{20}Ne$ REACTION AT 980 keV AND 1092 keV PROTON ENERGIES

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The radiative capture of protons by fluorine has been the subject of several investigations[1] and it has been established at few resonances below $E_p = 1100$ keV. The object of our investigation was to study the resonances at 980 keV and 1092 keV proton energies, partly in order to enable spin and parity assignments to be made to the 13.88 MeV excited level in ^{20}Ne, partly to obtain some informations on the width and isospin of this state.

Our preliminary results indicate that the angular distribution of the capture radiation to the 4.97 MeV state in ^{20}Ne is not isotropic and hence that the s-wave proton capture is not responsible for the formation of 13.88 MeV state in ^{20}Ne. If p-wave protons are assumed than, since the parity of $^{19}F + p$ is even, the parity of the capturing state in ^{20}Ne must be odd. The excitation curves of the low-energy radiations following the inelastic scattering of protons by ^{19}F indicate $J^{\pi} = 2^-$ assignment to the 13.88 MeV state. The radiative transition strength between this state and lower states in ^{20}Ne, combined with the non-resonant behaviour of excitation functions from $^{19}F(p,\alpha,\gamma)^{16}O$ reaction at 1092 keV proton energy, suggest $T = 1$ isospin assignment to this level. The measured width $\Gamma = 0.8$ keV of the resonance at $E_p = 1092$ keV agrees very well with the value $\Gamma \sim 1$ given in the literature[1]. The relevant data are shown in Fig.1.

REFERENCES

1) F. Ajzenberg-Selove, *Nucl. Phys.* A180 (1972) 1.

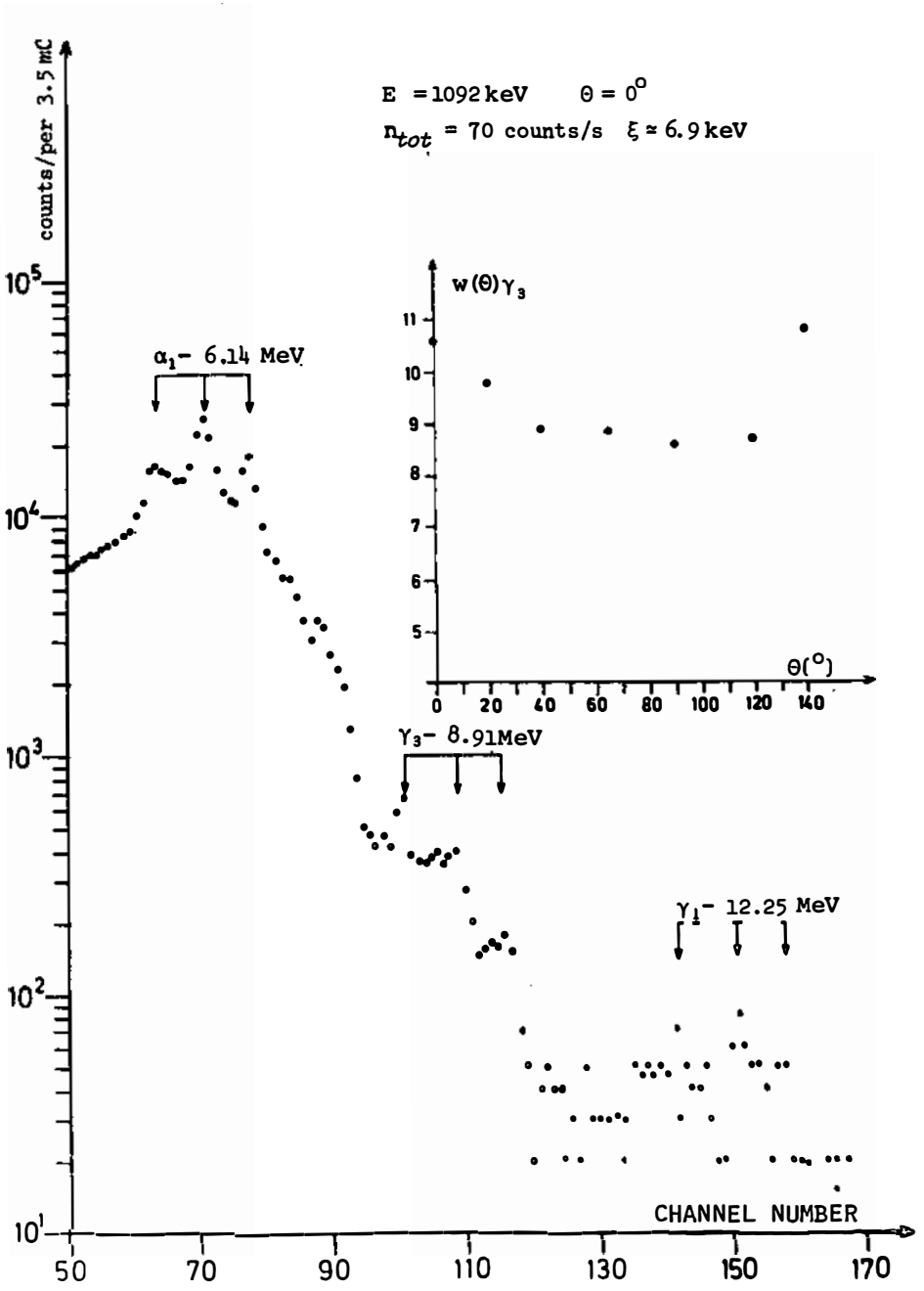
E = 1092 keV θ = 0°
n_{tot} = 70 counts/s ξ ≈ 6.9 keV
counts/per 3.5 mC
10^5
10^4
10^3
10^2
10^1
α_1 - 6.14 MeV
γ_3 - 8.91 MeV
γ_1 - 12.25 MeV
CHANNEL NUMBER
50
70
90
110
130
150
170
w(θ)γ_3
11
10
9
8
7
6
5
θ(°)
0
20
40
60
80
100
120
140

Fig. 1.