Distribution of Electric Multipole Strengths in $^{58}$Ni (*)

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Summary. - Inelastic electron scattering of 124 and 180 MeV electrons from $^{58}$Ni has been measured for momentum transfers of $0.4 \text{ fm}^{-1} \leq q \leq 1.2 \text{ fm}^{-1}$ with an energy resolution of 110 keV. Using DWBA form factors with Tassie transition densities, we have extracted the electric multipole strength for $L \leq 4$ residing in 28 discrete states and in the inelastic continuum below 22.5 MeV of excitation.

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With the availability of CW electron accelerators suited for coincidence experiments, interest in nuclear spectroscopy will increasingly shift to the nuclear continuum. With the present experiment we began an attempt to study continuum properties by inclusive inelastic electron scattering. Our approach, influenced by the study of giant resonances, is based on the consideration that after radiative background subtraction all of the cross-section may be decomposed into multipole strengths. We extend this decomposition also to quasi-free scattering contributions, which is in the spirit of similar work by the Sendai group (**). The target nucleus $^{58}$Ni was chosen for its simple

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24 - Il Nuovo Cimento A.
shell structure and because information on giant resonance is already available from inelastic hadron (2) and electron scattering (3). Our experiment differs

Fig. 1. — Bound-state region of a $^{58}$Ni(c, e') spectrum at 180 MeV and $\theta_{\text{lab}} = 65^\circ$. The group at $E_x = 0.9$ MeV is an $^{14}$O contamination.
