

Scattering Partial-Wave Equations and Resonance Equations

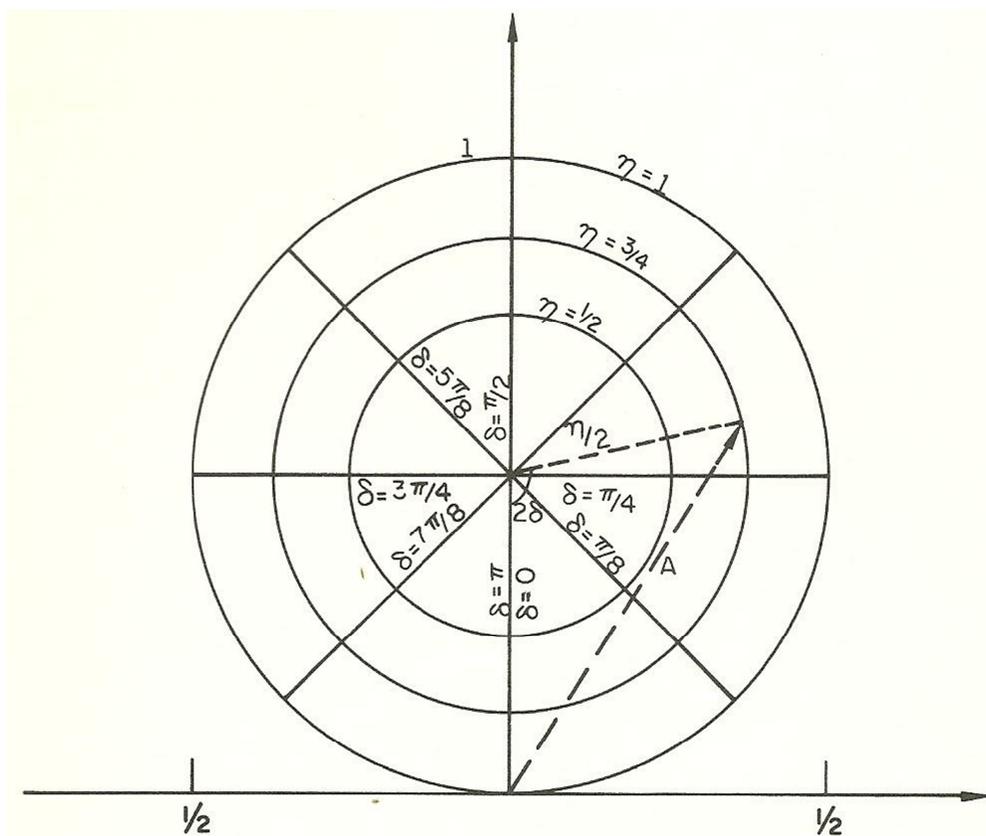
UCRL-14193, 21 May 1965 (Revised Aug 2010)

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Introduction

This document contains the figures for the document, [UCRL14193_RoperLD.pdf](#). The captions are included in the original document. The purpose is so that the two documents can be viewed side by side.

Figures



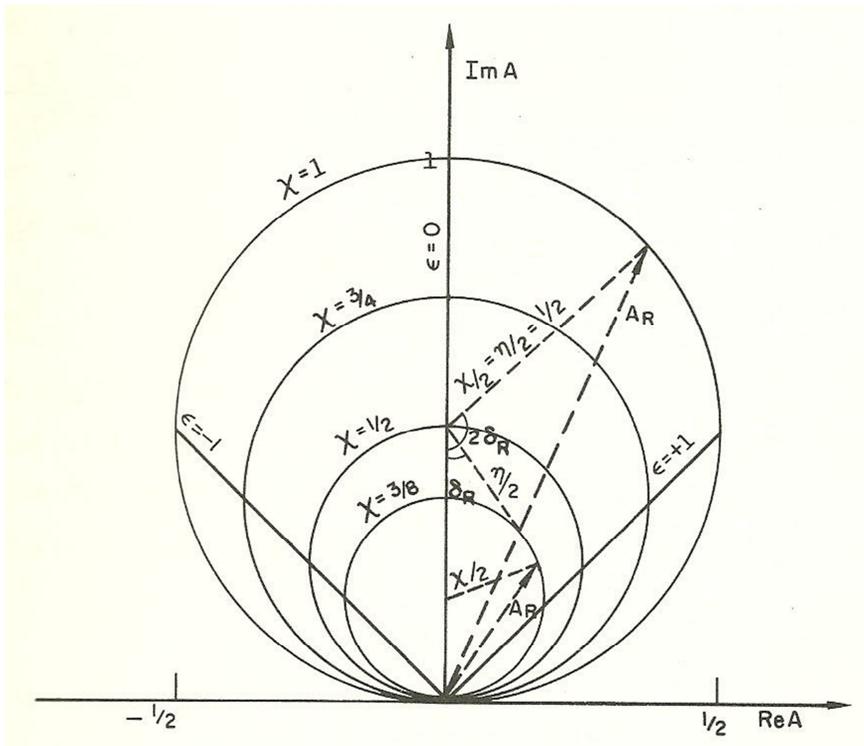


Fig. 2. Loci of resonance partial-wave amplitudes¹ in the complex plane for constant x (circles of radii $x/2$ centered at $(0, x/2)$ and for constant ϵ (radial lines emanating from $(0,0)$ to the outer circle). In general x is a slowly varying function of ϵ , so that the actual loci approximate circles.

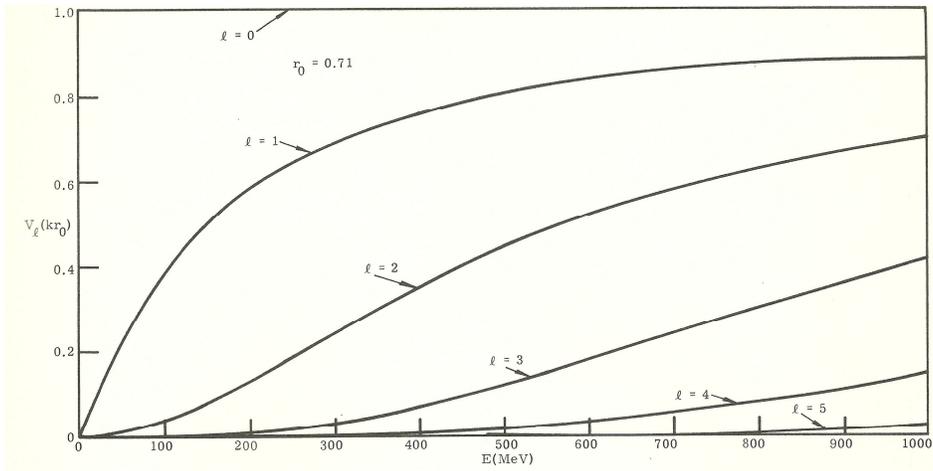


Fig. 3a.

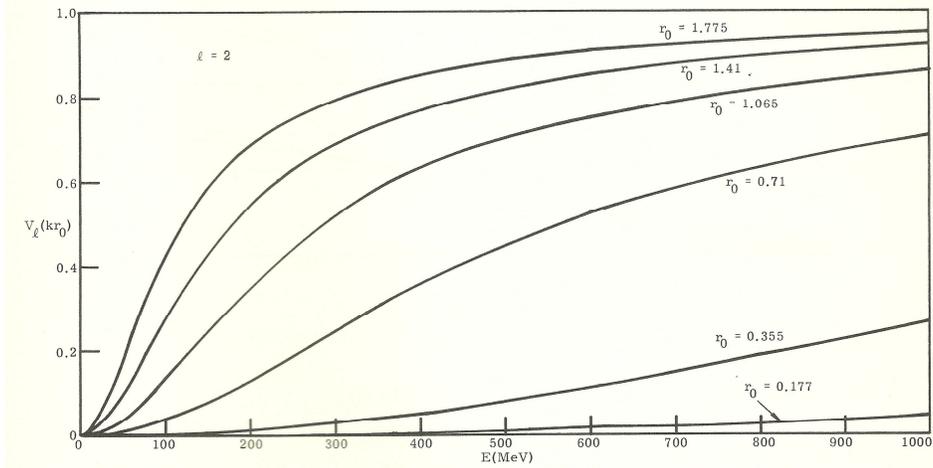
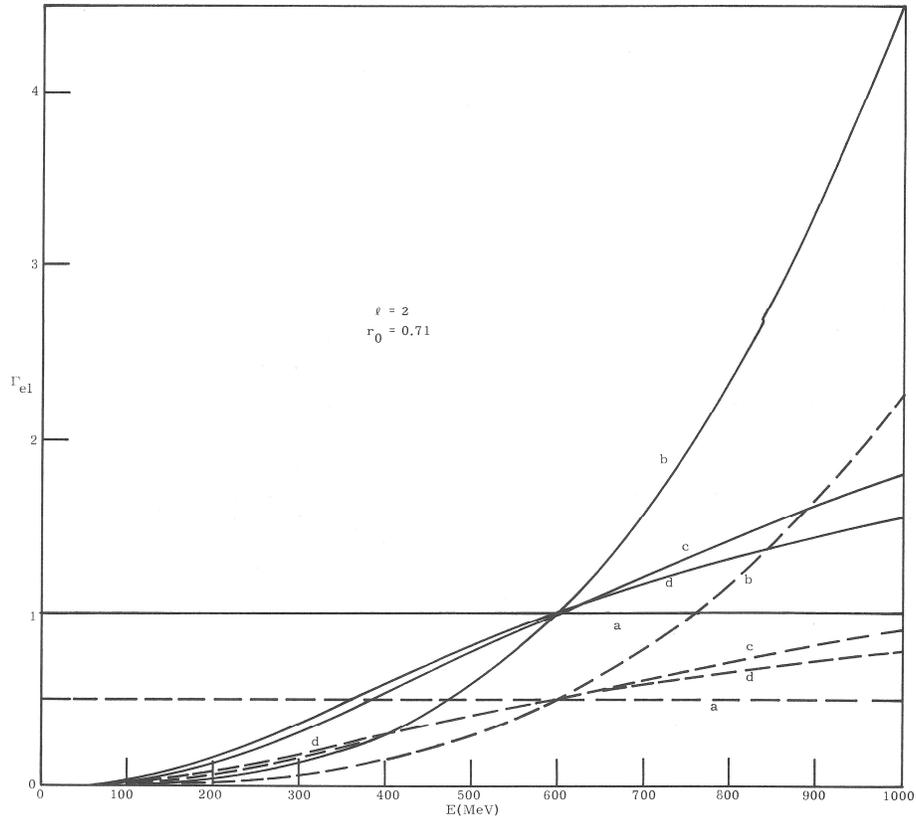


Fig. 3b.

Fig. 3a contains plots of $V_\ell(kr_0)$ for ℓ values from 0 to 5 and $r_0=0.71$ (≈ 1 fermi for pion-nucleon scattering). Fig. 3b contains plots for $V_\ell(kr_0)$ for $\ell=2$ and various values of r_0 .



In Fig. 4 we compare the four forms by setting C, C', γ^2 and γ'^2 such that $\Gamma_{e1}(E=E_r)$ is the same for all four forms.

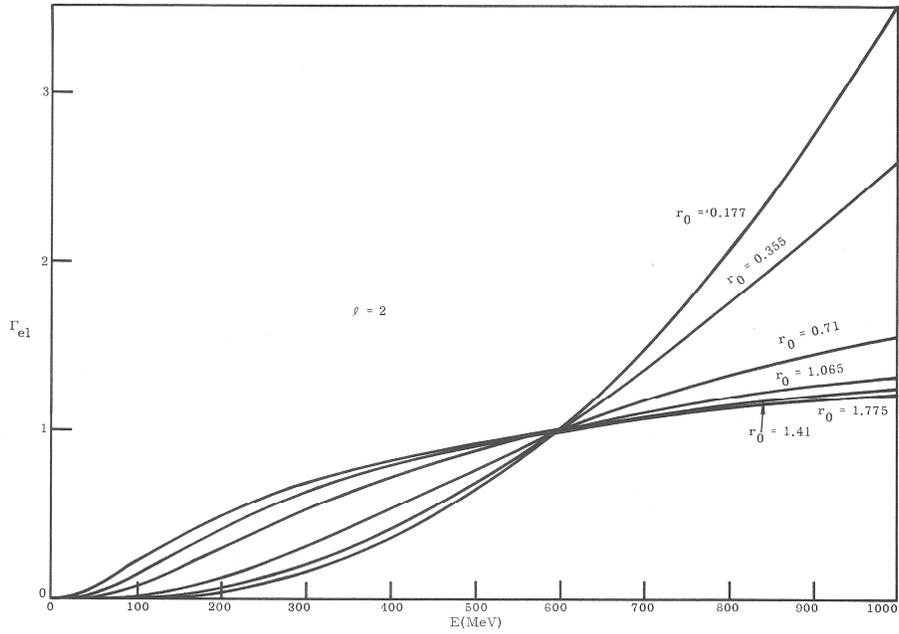


Fig. 5a.

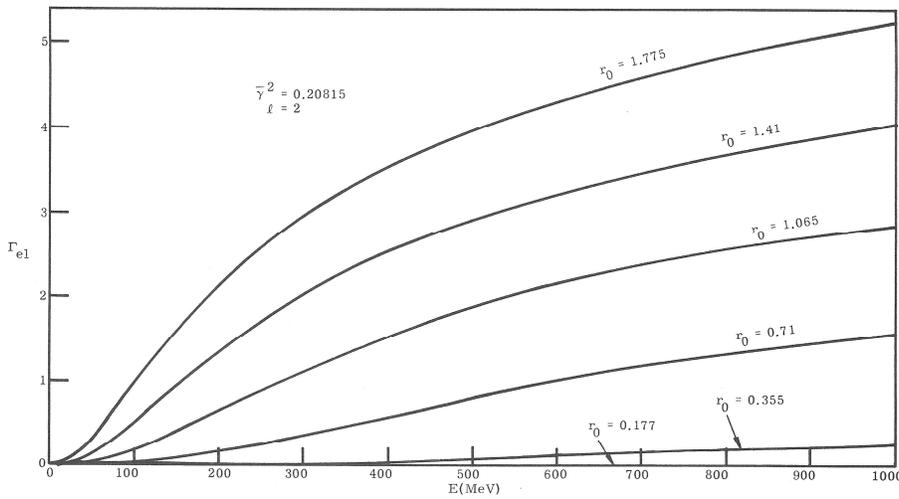


Fig. 5b.

In Fig.5a we plot form (d) for Γ_{el} with different values of r_0 . Fig. 5b shows form (d) for $\gamma^2=0.20815$ and different values of r_0 .

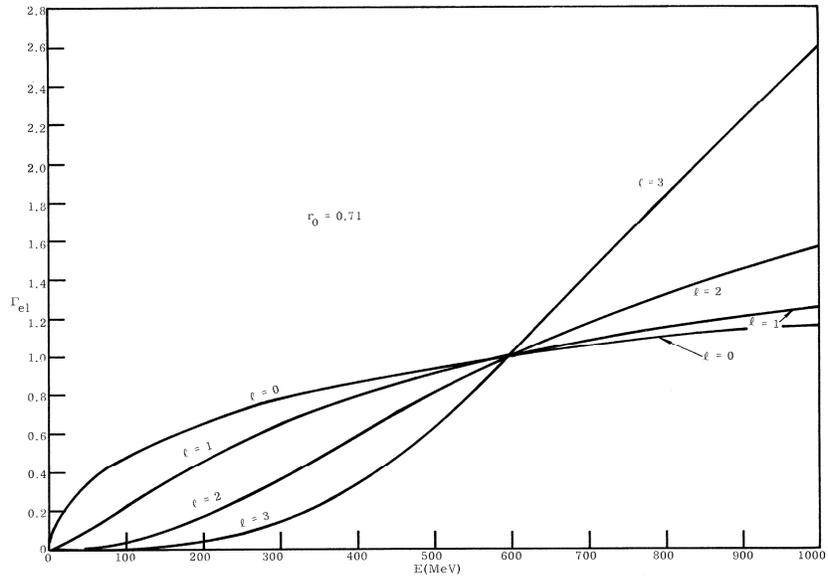


Fig. 6a.

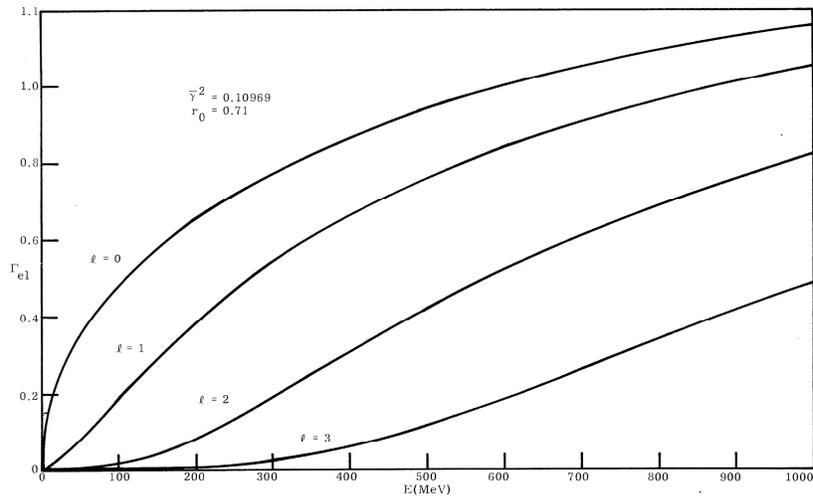


Fig. 6b.

In Fig. 6a we use form (d) and compare Γ_{el} [normalized such that $\Gamma_{el}(E=E_r) = 1.0$] for values of ℓ from 0 to 3. Fig. 6b shows form (d) for values of ℓ from 0 to 3 for $\gamma^2 = 0.10969$.

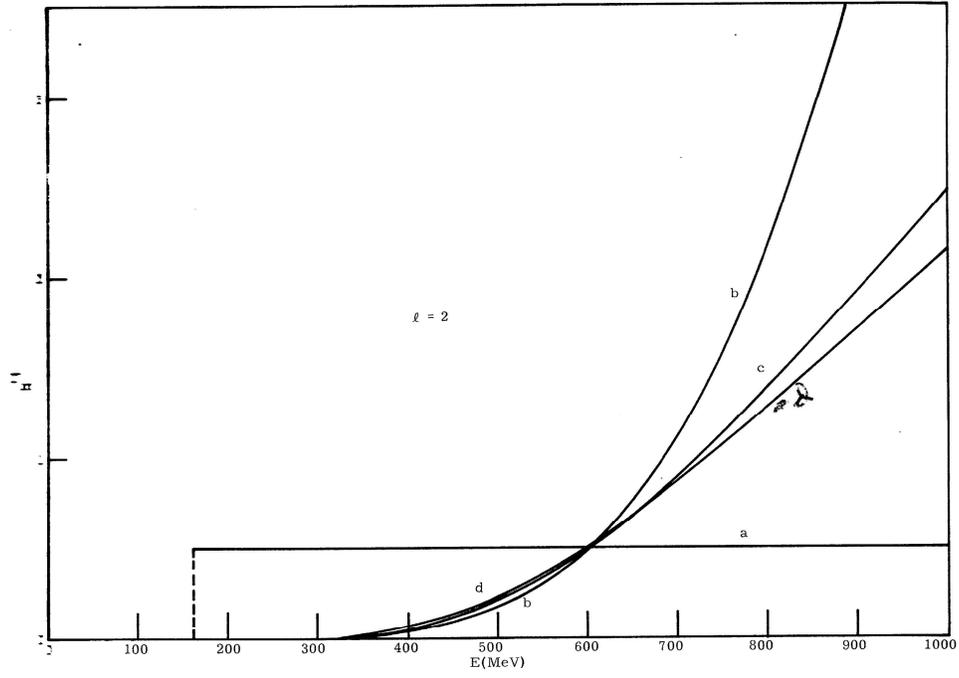


Fig. 7.

In Fig. 7 we compare the four forms for the energy dependence of Γ_{in} .

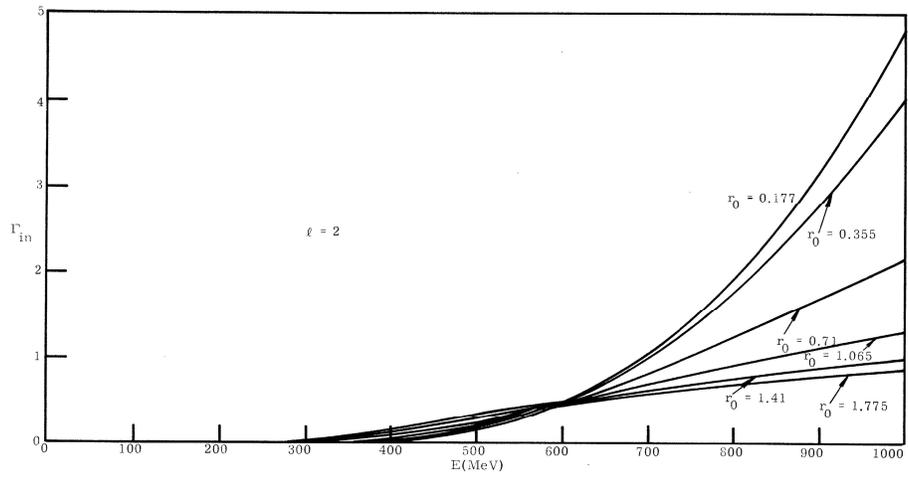


Fig. 8a.

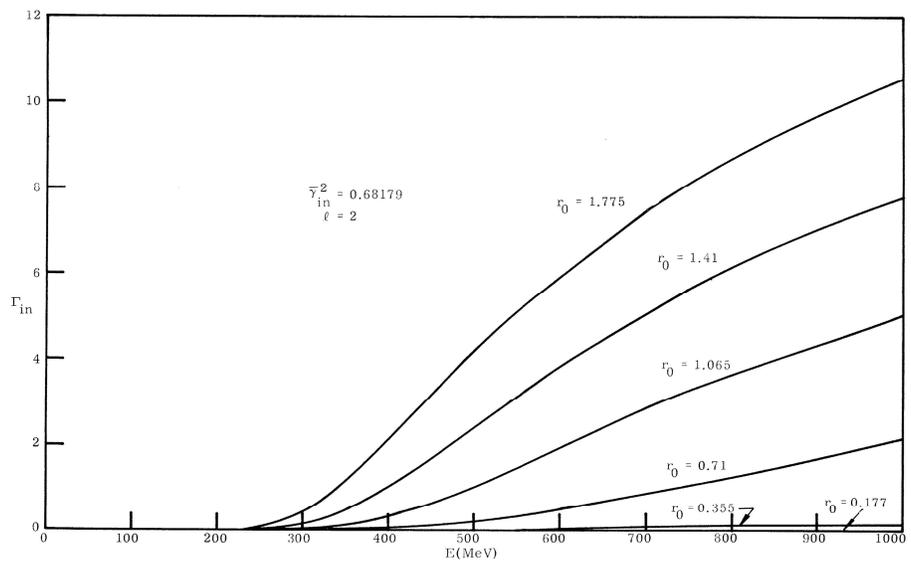


Fig. 8b.

In Fig. 8a we plot form (d) for Γ_{in} with different values of r_0 . Fig. 8b shows form (d) for different values of r_0 and $\bar{\gamma}_{in}^2 = 0.68179$.

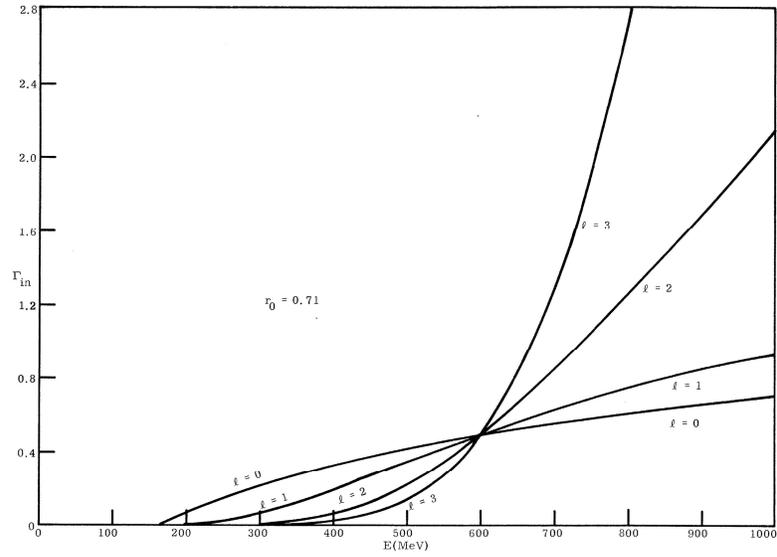


Fig. 9a.

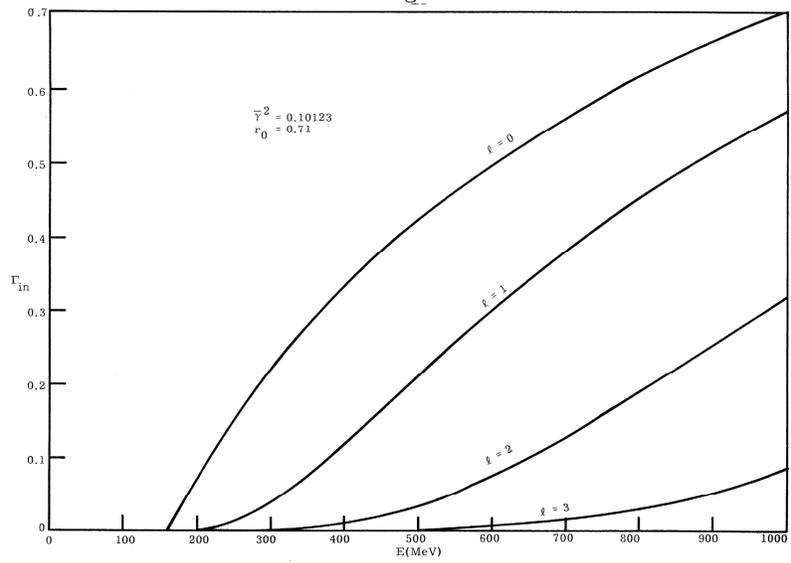


Fig. 9b.

In Fig. 9a we use form (d) and compare Γ_{in} , [normalized such that $\Gamma_{in}(E=E_r) = 0.5$] for values of ℓ from 0 to 3. Fig. 9b shows form (d) for values of ℓ from 0 to 3. for $\bar{\gamma}_{in}^2 = 0.10123$.

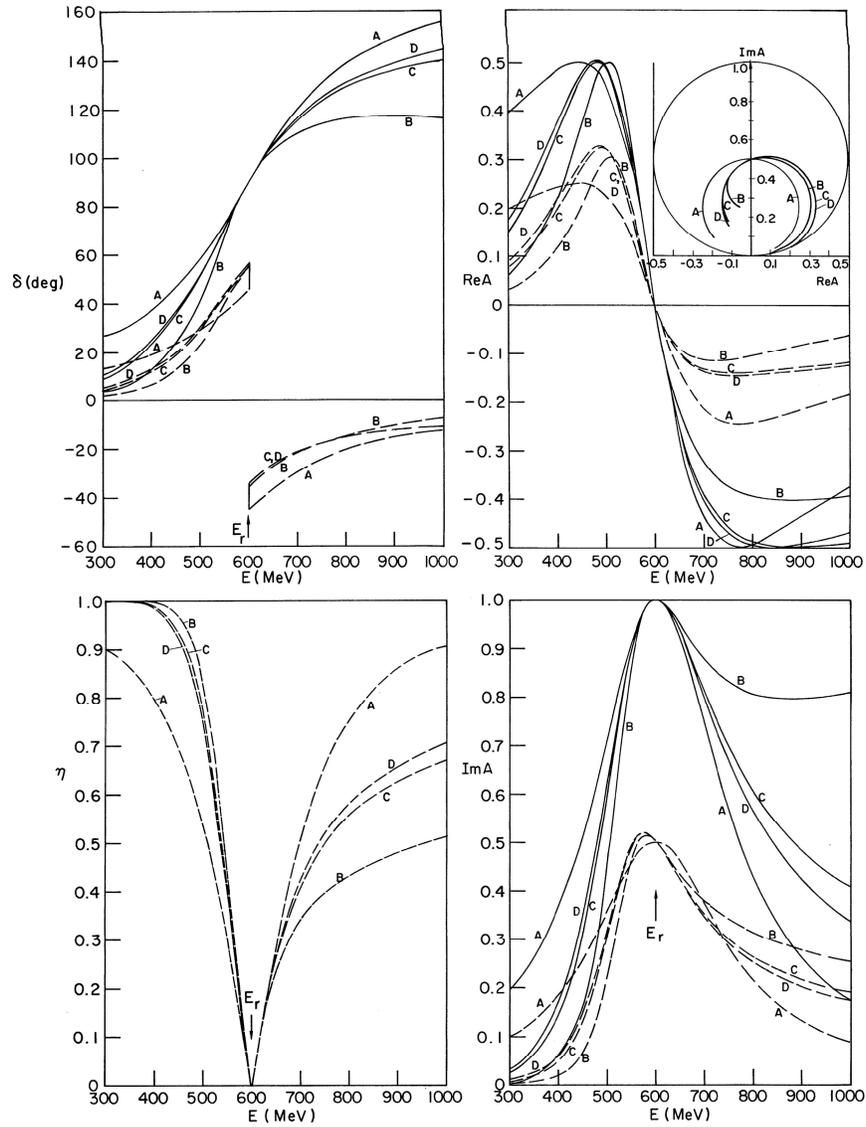


Fig. 10a.

Four numerical examples are shown in Fig. 10 in each of which we compare the four forms for the energy dependence of the elastic and inelastic widths. The first two examples are in Fig. 10a and the last two are in Fig. 10b.

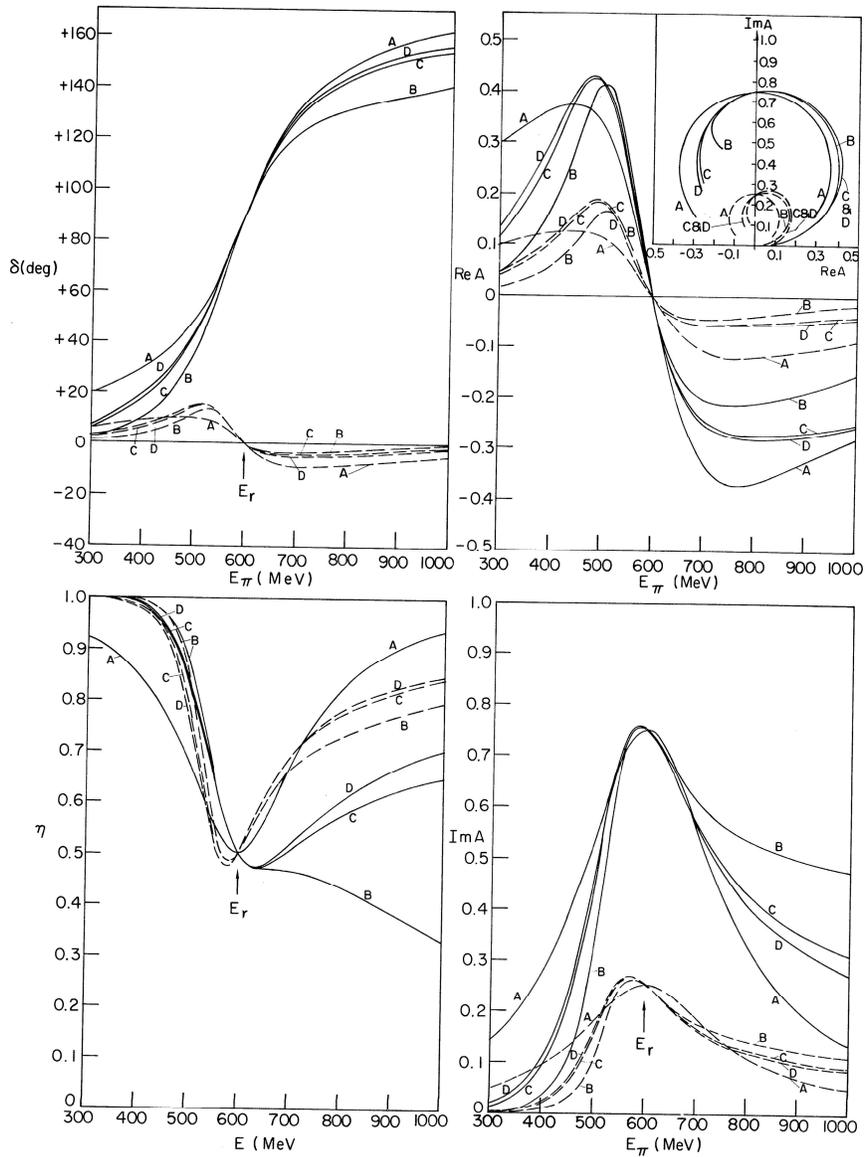


Fig. 10b.

Four numerical examples are shown in Fig. 10 in each of which we compare the four forms for the energy dependence of the elastic and inelastic widths. The first two examples are in Fig. 10a and the last two are in Fig. 10b.

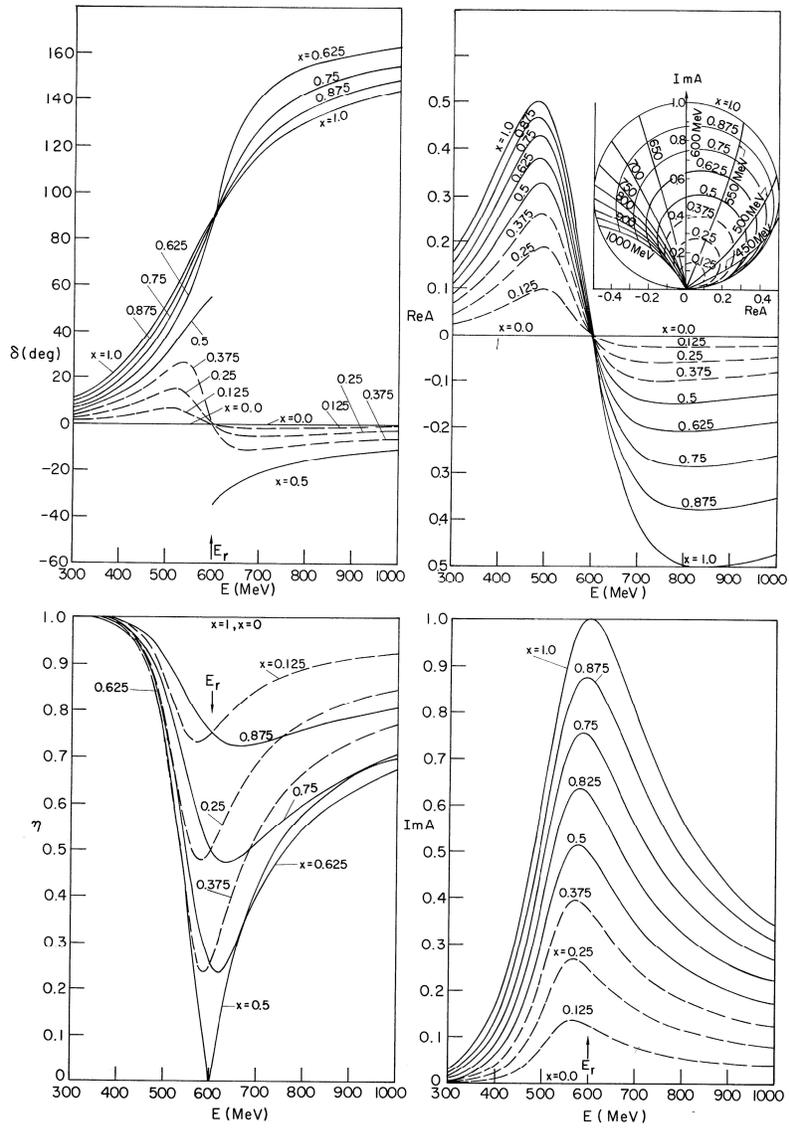


Fig. 11a.

Nine numerical examples are shown in Fig. 11a for nine different values of $x = \Gamma_{el} / \Gamma$ at $E = E_r$.

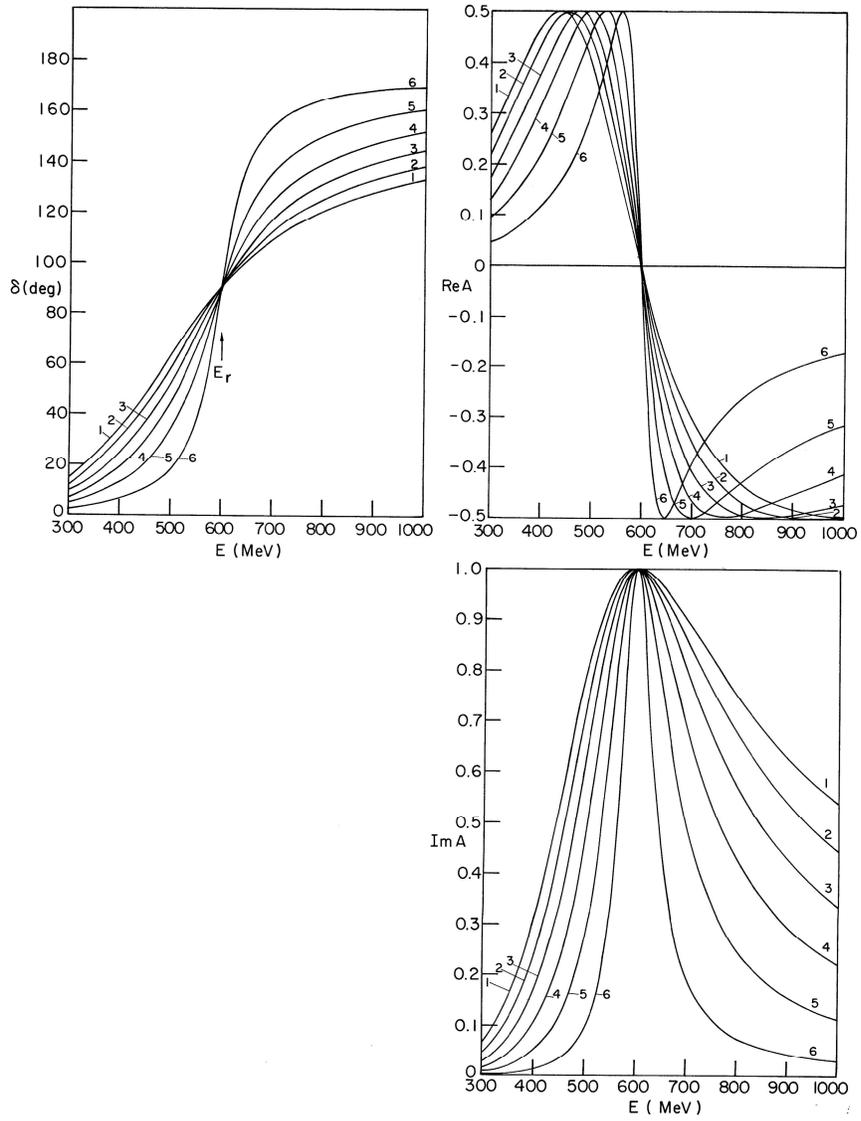


Fig. 11b.

In Fig. 11b we compare elastic resonances [$\chi(E=E_r) = 1$] for different values of γ^2 . We use $\ell=2, r_0=0.71$, and $E_r = 600$ MeV.

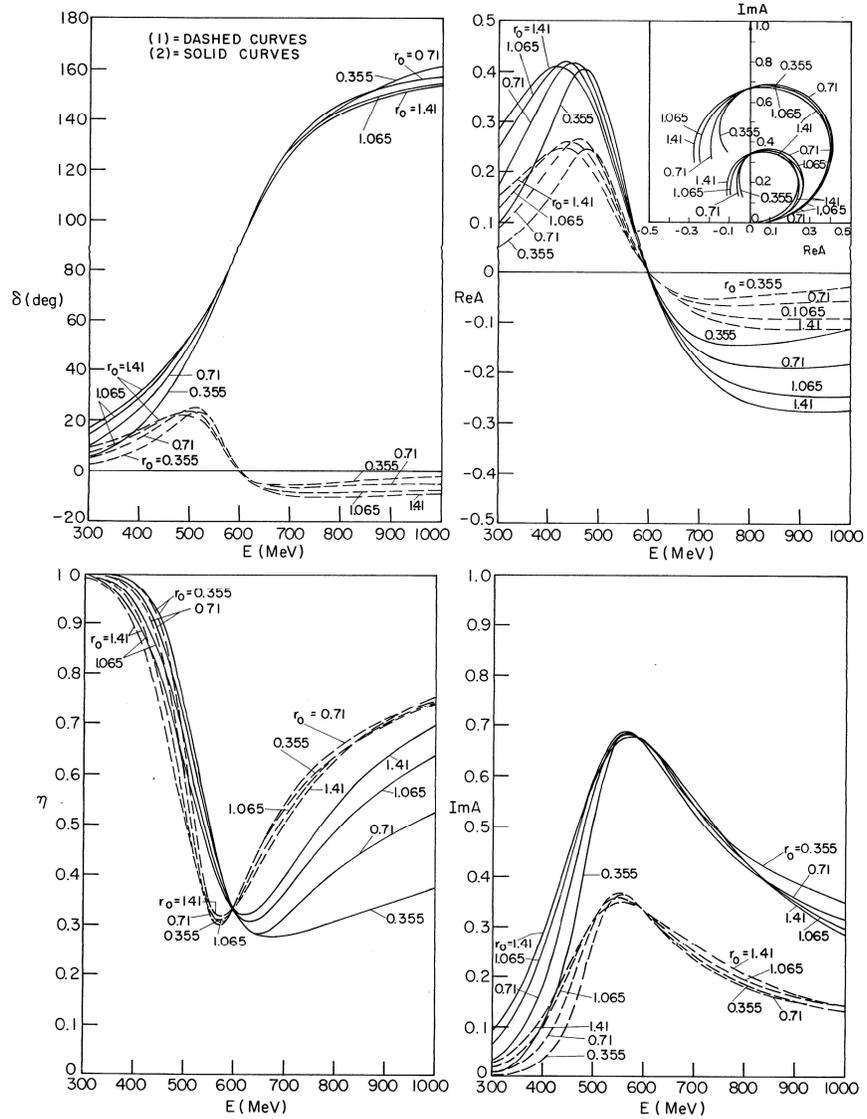


Fig. 12a.

Numerical examples for different values of r_0 at two values of $x(E=E_r)$ are given in Fig. 12a.

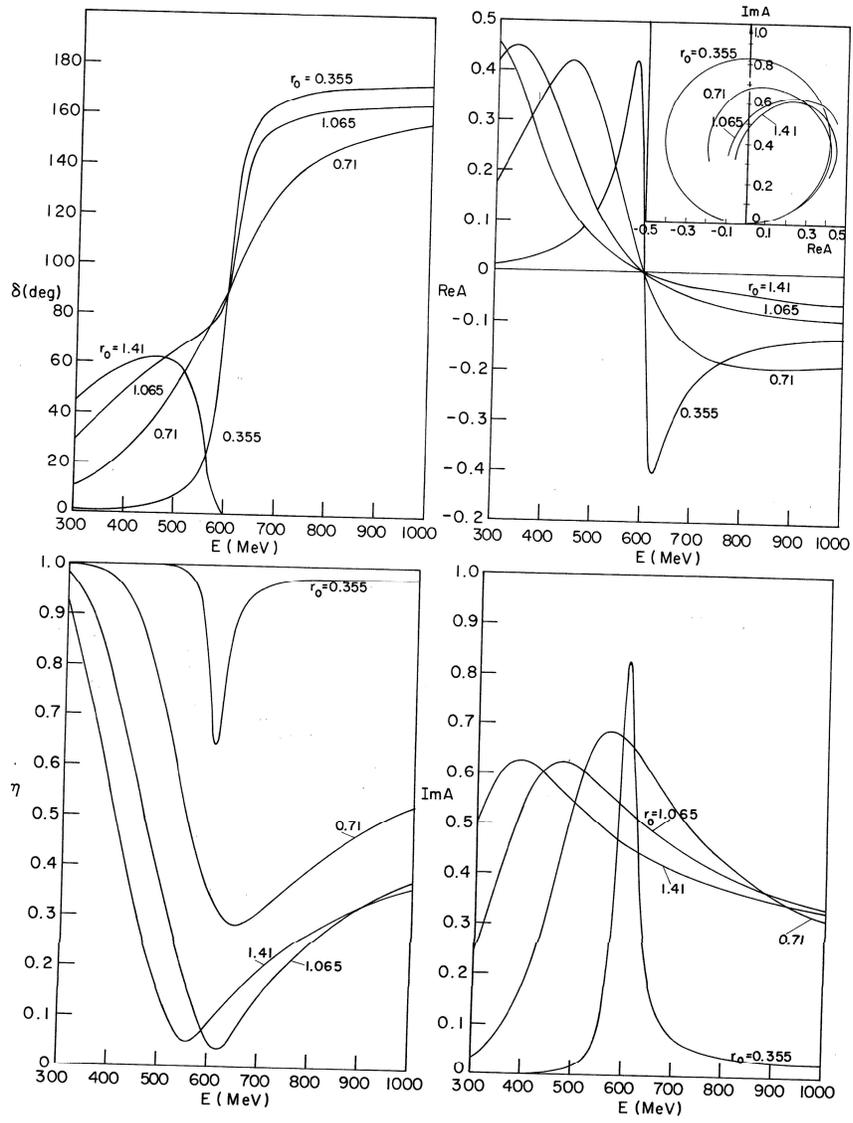


Fig. 12b.

Examples for different values of r_0 with $\gamma_f^2 = 0.20815$ and $\gamma_{in}^2 = 0.68179$ are given in Fig. 12b.

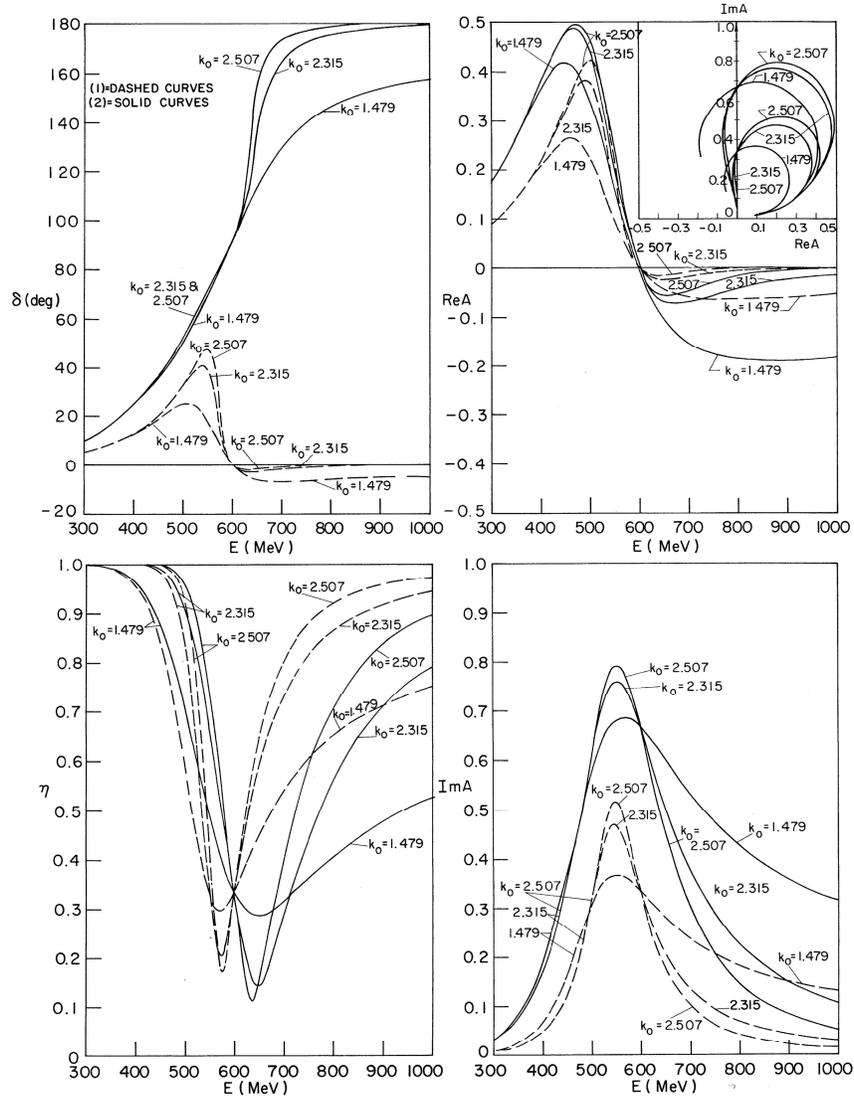


Fig. 13a.

Numerical examples for different values of k_0 at two values of $x(E=E_r)$ are given in Fig. 13a.

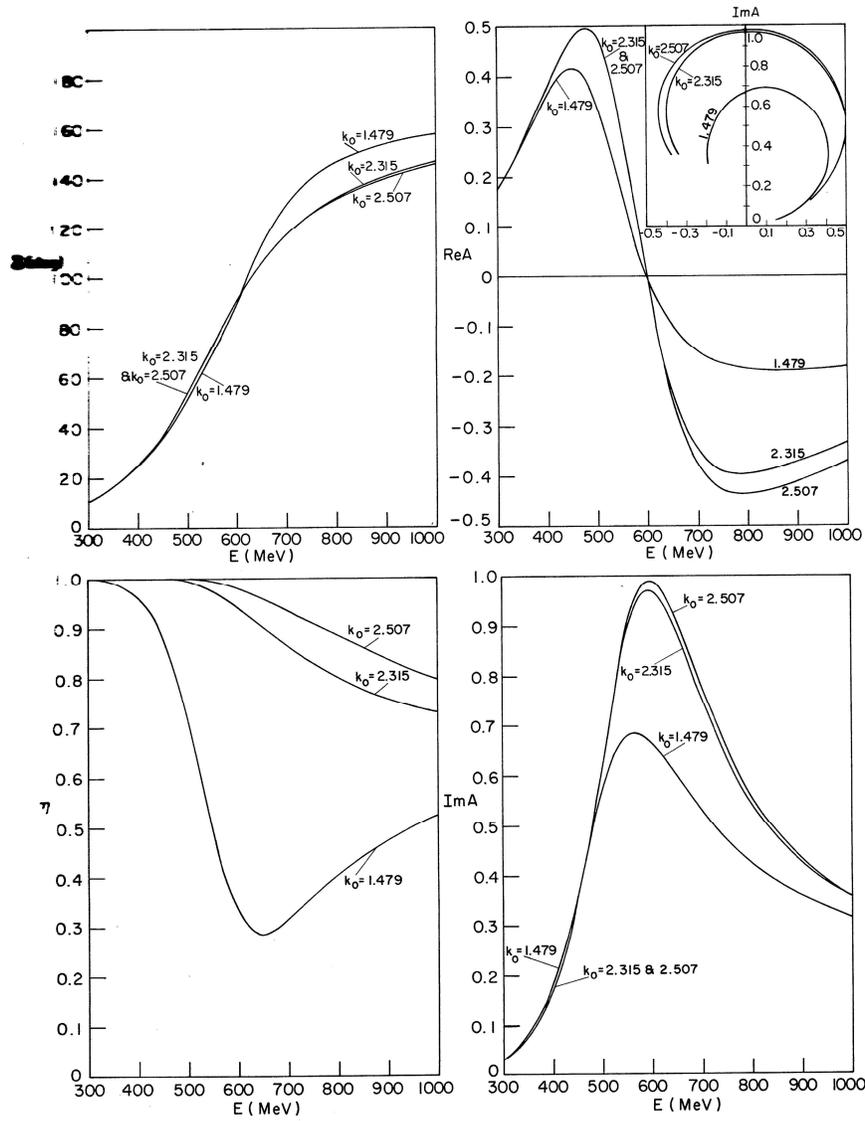


Fig. 13b.

Examples for different values of k_0 with $\gamma^2 = 0.20815$ and $\gamma_{in}^2 = 0.68179$ are given in Fig. 13b.

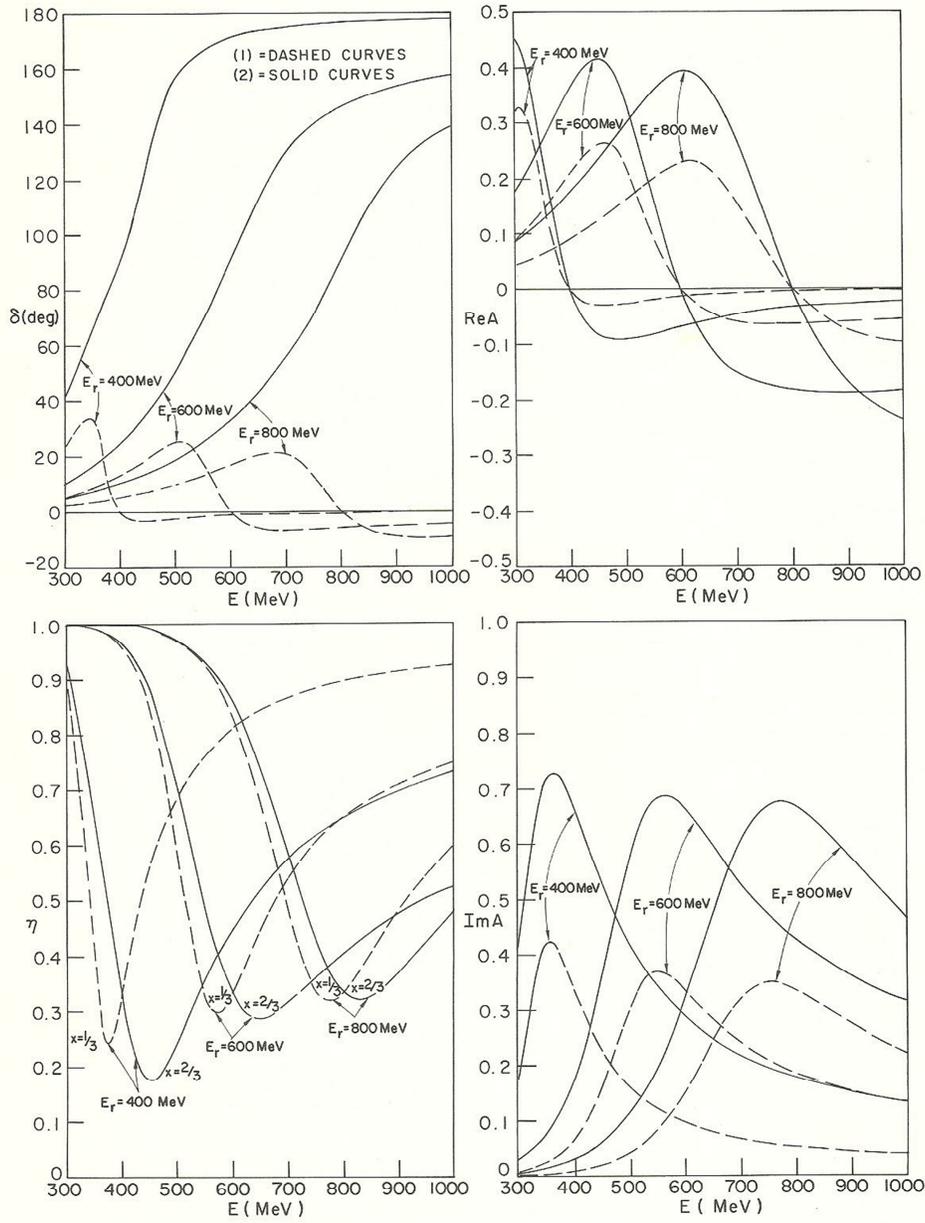


Fig. 14a.

Numerical examples for different values of E_r at two values of $x(E=E_r)$ are given in Fig. 14a.

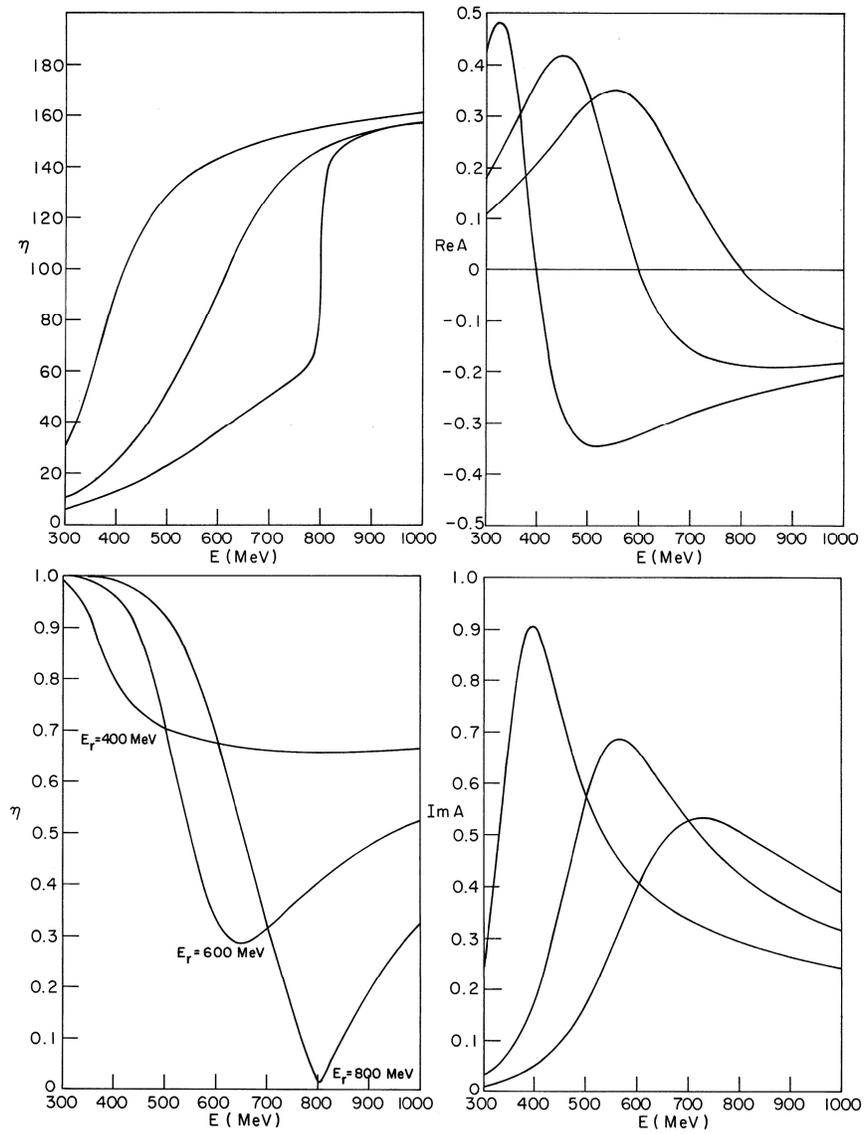


Fig. 14b.

Examples for different values of E_r with $\gamma^2 = 0.20815$ and $\gamma_{in}^2 = 0.68179$ are given in Fig. 14b.

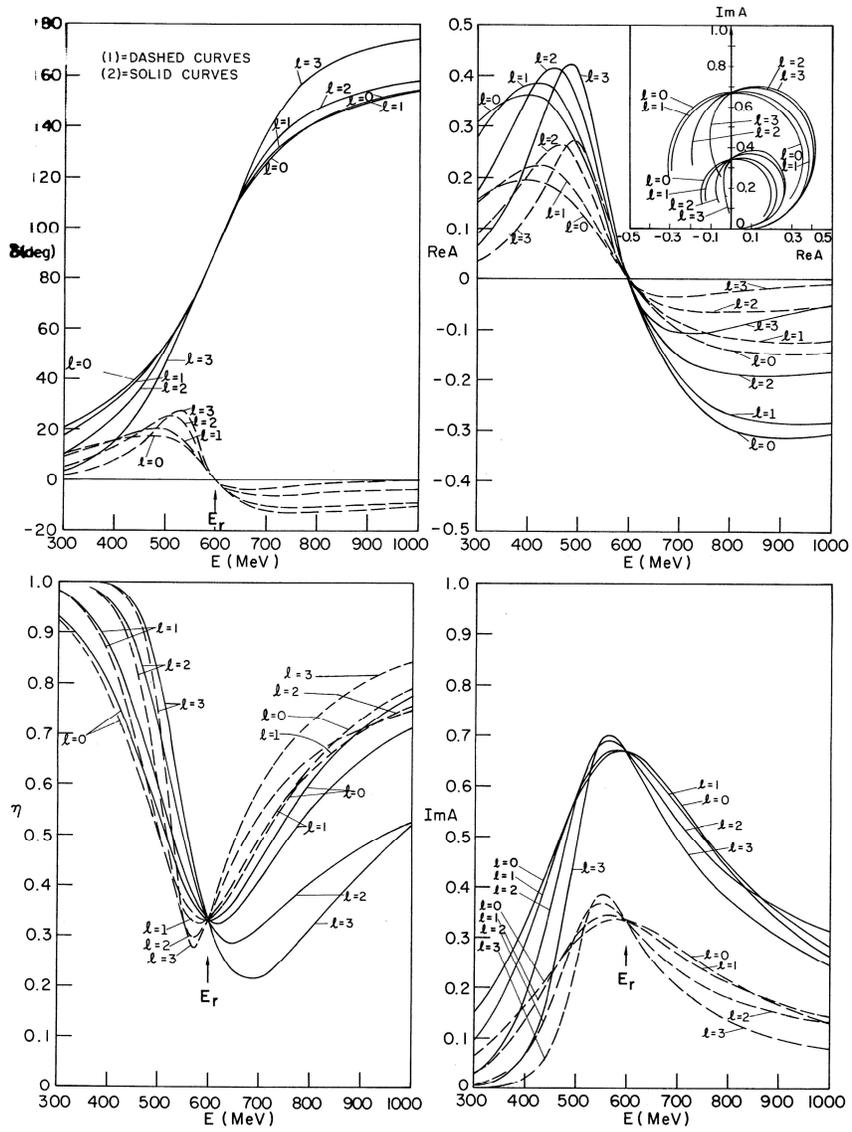


Fig. 15a.

Examples for different values of l at two values of $x(E=E_r)$ are given in Fig. 15a.

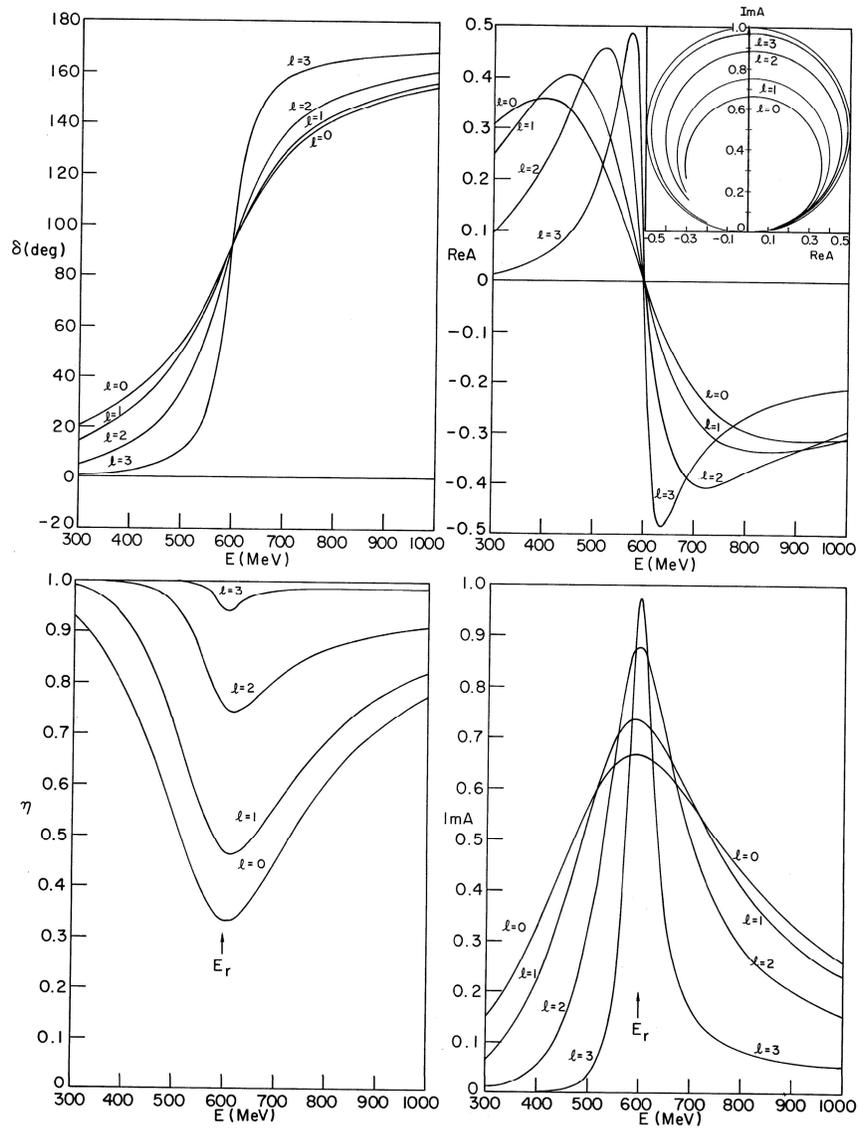


Fig. 15b.

Examples for different values of ℓ with $\gamma^2 = 0.10969$ and $\gamma_{in}^2 = 10123$ are given in Fig. 15b.