159(10): Electron Compton Scattering from Methane Gas.

Reference: 1) G. Cooper, A. P. Hitchcock, C. A. Chatzidimitriou-Dreismann and M. Vos, J. Electron Spec., 155, 28-34 (2007)

2) www.unicorn.mcmaster.ca/aph-publ/JEL_155_2007_28_34_Celestec_CH4.pdf

These data are for scattering of an electron of mass m from carbon of mass 12m. They are as follows.

θ/deg	θ/rad	q_V (a.u.)	E−E′ (eV)	ω′ / 10^18 (rad s^−1)
40	0.6981	7.5	204.08	2.1967
50	0.8726	9.3	253.06	2.1222
62.5	1.0908	11.4	310.21	2.0355
75	1.3089	13.4	364.63	1.9528
85	1.4835	14.9	405.44	1.8908
100	1.74525	16.9	459.87	1.8081

$$\omega = 2.5067 \times 10^{18} \text{ rad s}^{-1}$$

$$= 1650 \text{ eV}$$

$$1 \text{ a.u.} = 27.211 \text{ eV}$$

$$1 \text{ eV} = 1.51924 \times 10^{15} \text{ rad s}^{-1}$$

q_V = energy loss $E - E'$ in a.u.

2) Use the formulae of HFT 158 with:

$m = \underline{M1}$, $\underline{M1} \rightarrow \underline{2M}$ 1.99×10^{-26} kg

because the electron of mass $\underline{M}$ is scattered from the C atom of CH_4 or CD_4. The C atom is

m = Mass of electron = 9.10953×10^{-31} kg

$\underline{M}$ = Mass of carbon atom = 1.99×10^{-26} kg

In the old theory these are the accepted masses. In the de Broglie / Einstein theory of HFT 158 we evaluate

$\underline{M1} = 1.99 \times 10^{-26}$ kg, and evaluate

$m \mid \underline{M}$.