Compton scattering revisited T. SURIĆ, R. Boškovic Institute, Zagreb, Croatia, V. FLORESCU, University of Bucharest, Bucharest, Romania, B.K. CHATTERJEE, S.C. ROY, Bose Institute, Kolkata 700009, India, L.A. LAJOHN, R.H. PRATT, University of Pittsburgh, Pittsburgh, PA 15260, USA — Compton scattering of a photon by bound electrons is one of the fundamental processes of interaction of radiation with matter [1].Theoretical treatments of the process are often based on using impulse approximation (IA) which is, at nonrelativistic energies, obtained within $\mathbf{A}^2$ approximation of the electron-photon interaction (the $\mathbf{p} \cdot \mathbf{A}$ term is neglected). The validity of IA increases and the corrections decrease as the ratio p_{av}/k of average momentum p_{av} of bound electron and the photon momentum transfer k becomes small. The IA is often viewed as the leading term in the p_{av}/k expansion of the exact result. We examine the criteria of validity of IA for the triply differential cross section (TDCS) and for the doubly differential cross section (DDCS), which are different. We find that IA is in fair agreement with the exact expression for DDCS even when the expansion in p_{av}/k is not well convergent. We also examine the importance of the inclusion of the $\mathbf{p} \cdot \mathbf{A}$ term in IA, needed at relativistic energies even in the peak region. [1] P. Eisenberger and P. M. Platzmann, Phys Rev. A 2, 415 (1970); R. Ribberfors, Phys. Rev. B 12, 2067 (1975); P. M. Bergstrom *et al,* Phys. Rev. A 48, 1134 (1993); R. H. Pratt *et al,* Nucl. Instr. and Meth. B 261, 175 (2007).

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