Various telescopes including RXTE, INTEGRAL, Suzaku, and Fermi have detected steady non-thermal X-ray emission from the X-ray binary systems, which may involve strong magnetized neutron stars known as magnetars. Magnetic inverse Compton scattering is believed to be a leading candidate for the production of this intense X-ray radiation. Observations of the Compton process by electrons or protons via ultra-relativistic energies leads to attractive simplifications of the magnetic Compton cross section. We have recently addressed such a case by developing compact analytic expressions using correct spin-dependent widths acquired through the calculation of Sokolov & Ternov (ST) cross sections, focusing specifically on ground-state to ground-state scattering. Such scattering in magnetars can cool electrons down to mildly-relativistic energies. Moreover, soft gamma-ray flaring in magnetars may well involve strong Comptonization in expanding clouds of mildly-relativistic pairs. These situations necessitate the development of more general magnetic scattering cross sections, where the incoming photons acquire substantial incident angles relative to the field in the rest frame of the electron, and the intermediate state can be excited from several Landau levels. The cross sections treat the pleonastic resonances associated with various cyclotron transitions between Landau states. Polarization and spin dependence of the cross section for the four scattering modes is compared with the non-relativistic Thompson scattering cross section with classical widths. The work here is purely analytical and is done to give compact analytic expressions for the Compton cross sections. Results will find application to various neutron star problems, such as the computation of Edelkamp luminosities and polarization mode-switching rates in transient magnetic flares.

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