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Compton scattering of quantum plasmas

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The concept of Compton scattering, originally applied to electrons in vacuum, is extended to electrons in a quantum plasma. The photon-plasmon interactions are described in terms of the number of plasmons with a certain frequency, scattered by an electron, as an intrinsically nonlinear process. The relativistic state of spinless electrons submitted to a Klein-Gordon equation is given in terms of Volkov solutions. The scattering probability and a recoil formula are derived, now for photon-plasmon interactions, in analogy with the traditional Compton scattering results.

References

[1] J. T. Mendonça and F. Haas, Compton scattering of plasmons. Physica Scripta v. 98, p. 065603 (2023).