

# Langmuir waves in Kappa plasmas

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A detailed resource to data analysis shows that the widely known van Hoven and Derfler–Simonen laboratory results are far from reasonable agreement with the standard Bohm–Gross dispersion relation. We provide an extension of the usual notion of a polytropic index to non-Boltzmann–Gibbs statistics. Such an extension allows for the deduction of an equation of state of charged particles with the basis on the Kappa density distribution. That equation of state, in turn, enables suprathermal corrections to the standard dispersion relation. As a consequence, we prove that the employment of our suprathermal formula is in excellent agreement with the experimental data. Possible further applications of our theory are briefly addressed.

## References

[1] F.E.M. Silveira, M.H. Benetti, I.L. Caldas, Phys. Plasmas 29, 052113 (2022).