# Recharacterization of Photons in Plasma Medium to Mimic IBG

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November 12, 2022

# Introduction

- Quantum Ideal Gases

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- Photon Statistics

# Plasma Medium

- Why Plasma?

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- Plasmon-Polariton

# Modelling the medium

- Hamiltonian

$$H = \frac{1}{2m}\sum_{i=1}^{N_{ch}}(p_i - \frac{e}{c}A)^2 + \hbar\omega(\frac{1}{2} + a^\dagger a),$$

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- Hamiltonian

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- Diagonalizing the Hamiltonian and other approximations

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- Diagonalizing the Hamiltonian and other approximations
- Effective Hamiltonian

$$\mathcal{H} = \hbar\Omega(b^\dagger b + \frac{1}{2})$$

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$$\overline{N} = (\partial_\mu \Phi)_{V,T}, \;\; \overline{E} = (\partial_\beta \beta\Phi)_{\beta\mu}, \;\; S = -(\partial_T \Phi)_{\mu,V}, \;\; P = \overline{E}/3V$$

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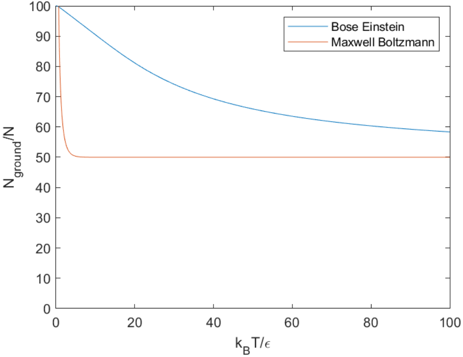
- Formation of BEC



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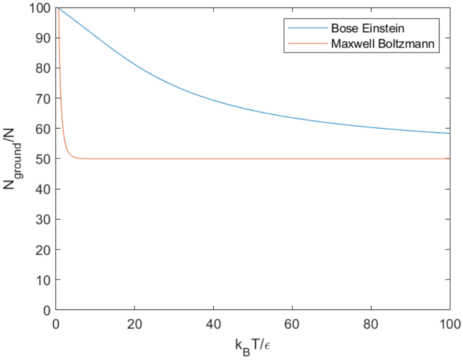


- Bose Einstein condensation is just a phase transition where the ground state becomes highly occupied

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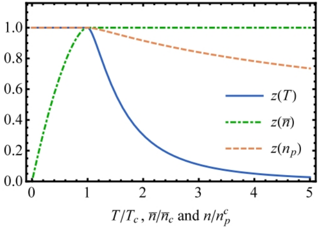


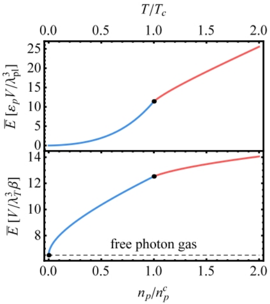

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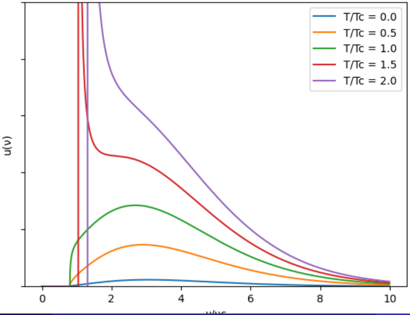
- Critical points



# Summary

- Effective mass of photons
- Mimicing an ideal Bose gas and formation of BEC
- Modified Planck's distribution
- Further research