

Introduction

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Theoretical Framework

The spectral energy density $u(\nu, T)$ is given by:

$$u(\nu, T) = \frac{8\pi h\nu^3}{c^3} \frac{1}{e^{h\nu/k_B T} - 1} \quad (1)$$

where h is Planck's constant, ν is frequency, c is the speed of light, and k_B is Boltzmann's constant. In the low-frequency limit ($h\nu \ll k_B T$), this reduces to the Rayleigh-Jeans approximation $u(\nu, T) \approx 8\pi\nu^2 k_B T / c^3$.

- In the high-frequency regime, the exponential cutoff dominates
- At low frequencies, the classical approximation holds
- The peak frequency ν_{\max} shifts linearly with temperature

Methods

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Experimental Setup

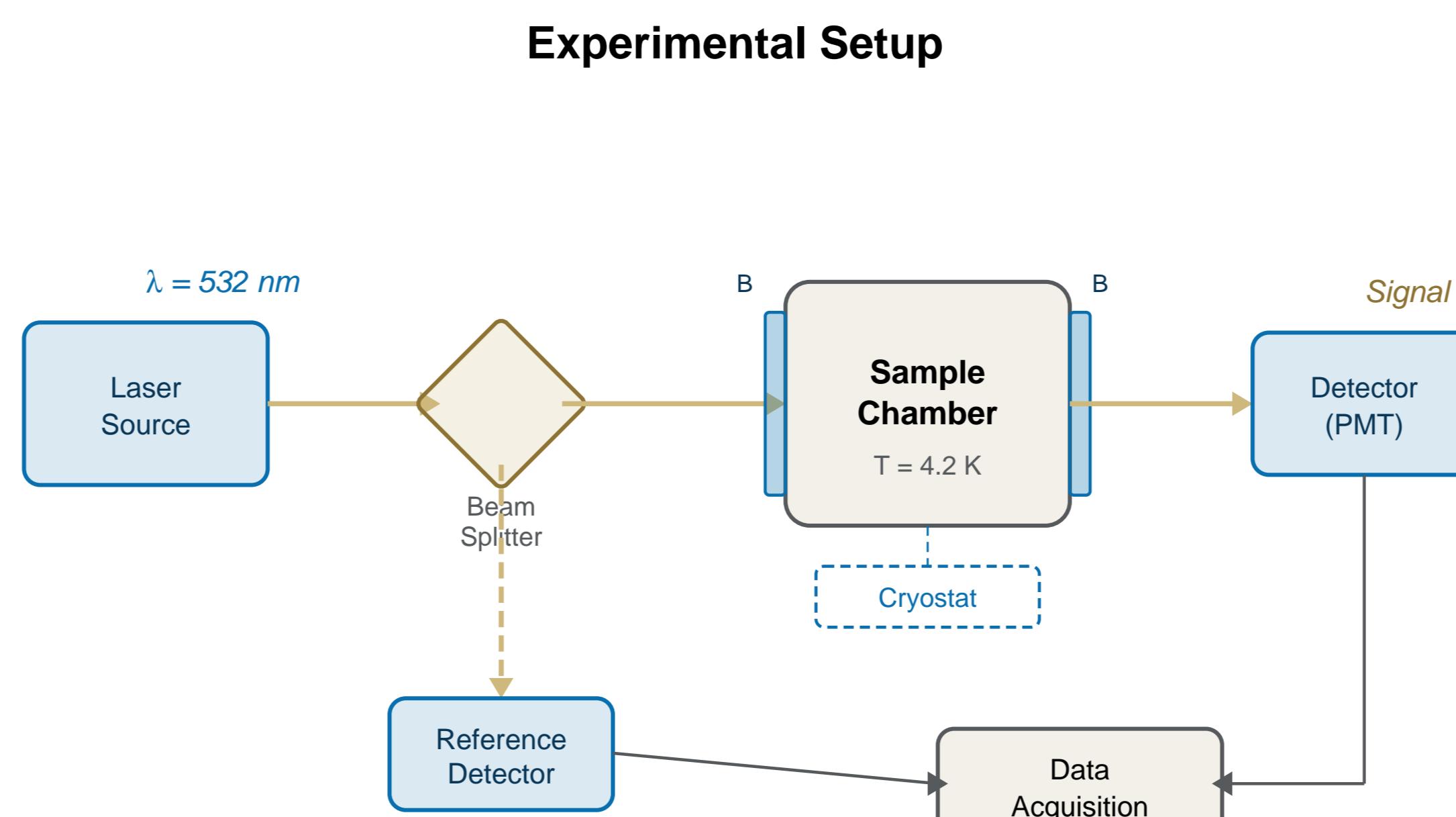


Figure 1. Schematic of the experimental apparatus.

Results

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Table 1. Summary of measured experimental parameters.

Parameter	Value	Uncertainty
Sample temperature (K)	4.21	± 0.05
Applied field (T)	1.50	± 0.01
Resonance frequency (GHz)	9.38	± 0.02
Linewidth (MHz)	12.7	± 0.3
Signal-to-noise ratio	42.0	± 1.5

The measured spectral distribution is consistent with the theoretical prediction from Eq. (1), confirming the validity of the model across the full frequency range examined.

Data Analysis

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Data Analysis (continued)

Spectral Energy Density vs. Frequency

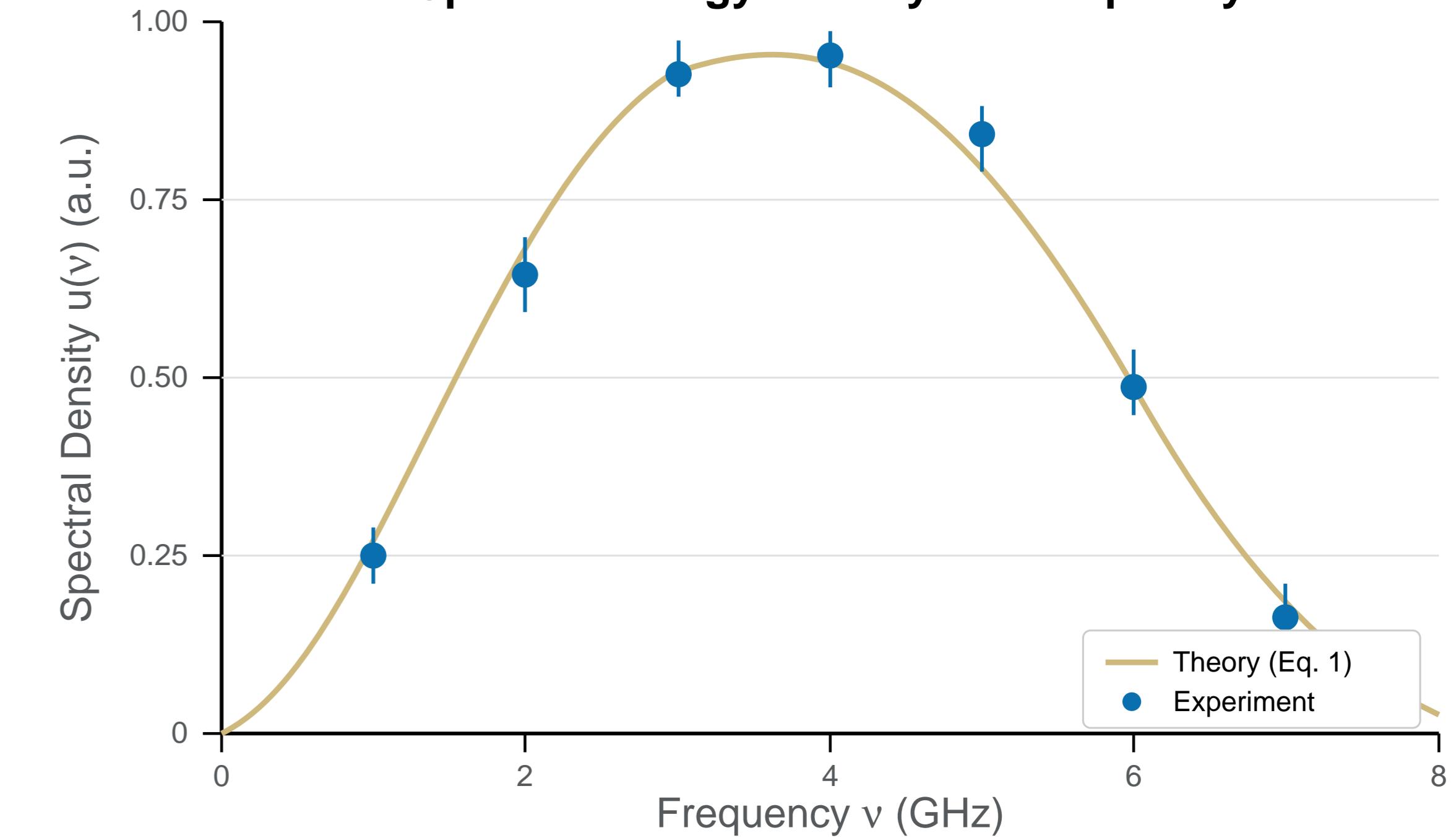


Figure 2. Measured values as a function of the control parameter. The gold line shows the theoretical prediction from Eq. (1); blue points are experimental data with error bars.

Central Result

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Discussion

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras imperdiet vel elit dignissim cursus. As shown in Eq. (1) and Fig. 2, the results are consistent with our initial hypothesis [4].

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Main Conclusion

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References

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Acknowledgments

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