Compressive Sampling for Terahertz Spectroscopy

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Aim

This project aims to investigate whether **Compressive Sampling can be utilized to reduce** the data acquisition time for Terahertz time domain spectroscopy (THz-TDS).

Backgrounds

What is Compressive Sampling?

Compressive Sampling is a technique that allows a signal to be sparse reconstructed despite failing the conditions set out in the Nyquist Sampling Theorem. It can successfully recover signals from as little as 10% of the data required within the Nyquist regime.



Two steps for Compressive Sampling Reconstruction:

1. Compress under sampled sparse signal



(Baraniuk 2007) **2.Decompress underdetermined system:**

 $\widetilde{x} = \arg \min \|x\|_1$, subject to constriant $y = \Phi x$







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Significance

If it is possible to reconstruct the THz Spectroscopy with under sampled THz TDS, the acquisition time will be dramatically reduced.





References

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