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THIS IS THE TITLE OF YOUR THESIS!

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DISSERTATION

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Abstract

What's your abstract?

To whomever...

Acknowledgments

Here you acknowledge everyone.

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1 Introduction

This is an example of another chapter... not much here to speak of. But you can cite various authors in your bibliography like this: [1].

2 Superconductivity

This is an example chapter. This example includes how to include figures (see Fig.2.1).

There is also an example of an equation (see Eq.(2.1) written in a tabular format which is determined by the use of the '&' character in the syntax. This is useful for keeping the equals signs aligned if the equation requires more than one line.

$$\begin{aligned}\langle Z^A(t_D)\rangle &= \frac{1}{N_Z}\sum_{n=1}^{N_Z}\cos\left\{\left[\Omega+\frac{d\Omega}{dI_0}\delta I_0\left(t_A\right)\right]t_D\right\}e^{-\frac{t_D}{\tau_\phi^0}}\\ &= \frac{1}{N_Z}\sum_{n=1}^{N_Z}\cos\left\{\Omega\left[1+\Lambda\delta i_0\left(t_A\right)\right]t_D\right\}e^{-\frac{t_D}{\tau_\phi^0}},\end{aligned} \tag{2.1}$$

Here's another example of an equation:

$$\frac{I}{I_{c0}} = \sin\phi + Q^{-1}\frac{d\phi}{d\tau} + \frac{d^2\phi}{d\tau^2}, \tag{2.2}$$

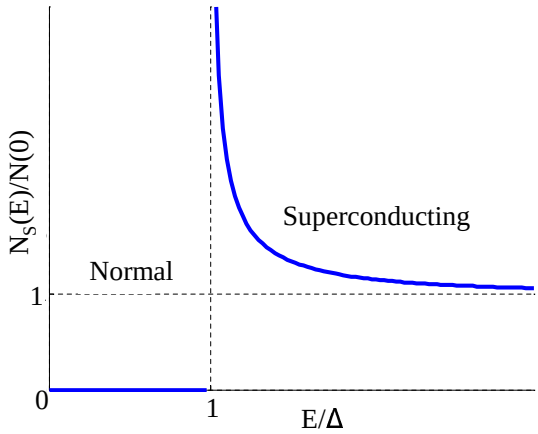

Figure 2.1 *Density of states in a superconductor verus a normal metal, with reference to the Fermi Energy. All the states below the gap energy in the normal metal are forced above the gap energy in the superconductor.*

Appendices

A Spin Echo Technique

Here's an example appendix on the spin echo technique. Not likely to be necessary for you :)

In NMR a spin-echo technique is used to reduce or eliminate the effect of the broadening of the ensemble spin vector with time. Initially a parallel magnetic field is used to align weakly all the spins in an NMR sample. Immediately following this alignment step, a perpendicular field is applied for a period of time sufficient to rotate the ensemble spin vector by $\pi/2$. Typically, at this point the spins are allowed to freely evolve. Due to spatial inhomogeneities in the parallel magnetic field some of the individual spin vectors will start to precess clockwise, and some will precess counterclockwise. This constitutes a "fanning-out" or broadening of the ensemble spin vector. This is allowed to proceed for a specific amount of time, τ, after which another perpendicular field pulse is applied, this time rotating the spin vectors by π. After waiting for a period of time equal to τ, the individual spins have precessed back to the original starting point, and the measurement of T_1 or T_2 can proceed as usual. This process eliminates the effect of spatial field inhomogeneities which degrade the signal during the period of time when ringing in the control electronics forces the experimenter to wait before making any measurement. Due to any spatial inhomogeneity in the ambient field, this delay would contribute to dephasing that would artificially decay the NMR signal. A process similar to this can be applied to qubit control and readout.

When applied to qubits, the goal is to reduce the effect of $1/f$ fluctua-

tions on the qubit's coherence times. The exact procedure followed by an experimenter attempting to use a spin-echo technique will differ depending on the type of qubit and control method in use. But mathematically the procedures are analogous and result in the same desired "re-focusing" that eliminates the effect of fluctuations occurring on a time scale longer than the period of time it takes to perform a qubit state measurement.

References

[1] K. M. Lang, S. Nam, and J. Aumentado. *IEEE Trans. Appl. Supercond.*, 13:989, 2003.