The title of the proposal should be concise and clear; e.g. An Electron Spin Resonance Spectrometer for the Study of Quantum Tunnelling in Mn_{12} acetate.

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(Dated: September 11, 2018)

Provide a brief summary of the proposal here. This should be a concise statement of what will be accomplished, the methods that will be used, and the potential significance. Many of you have already sent me a description of the project that can be put here with some touching up. I will only accept LATEX complied files in pdf format. They must be emailed to me a few days before the oral presentations. Make sure your supervisor has a chance to read it over before you hand it in.

PACS numbers:

I. MOTIVATION

In this section introduce the subject of the proposal and provide all the necessary background information that will be needed for a **non-expert** to understand. This should involve reading at least 5-10 journal articles some of which your supervisor will likely provide and others you will need to look up. These should all be listed in the bibliography. Items in the bibliography can be referenced as follows. [1], [2]. The text inside the curly brackets are used to label the references. Numbers appear automatically in the compiled text.

Most importantly you must provide the scientific motivation for why this project should be carried out and what scientific impact it could have if it were completely successful. Any research project requires a substantial investment of resources (money for equipment, use of common facilities, computer time for calculations/data analysis, the countless hours spent by you and your supervisor etc.) You must convince the reader/reviewer that the project and the potential outcome is worth this investment. Imagine that only a fraction of the proposals submitted will be approved. If yours is not approved then you must rework the proposal or find another project for which the scientific justification is stronger. This is typical of the competitive environment one is often faced with in research. There is always a demand for resources and/or access to facilities which exceeds the availability. Only the best projects get funded or receive time on a facility (e.g. telescope or accelerator). It is your responsibility to make the case that your proposal should be approved. In this case I am the reviewer who decides if you get approval.

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II. THEORY

In this section provide details on the theory needed to clarify the physics/astophysics behind the proposal. If you are building an ESR spectrometer you would need to explain the Zeeman interaction of an electron in a magnetic field. Use diagrams wherever possible. These can be reused or revised later for subsequent oral presentations and the thesis. Spend the time now to make up some good ones. Important points are: (1) they must be legible. (2) all axis properly labelled with units etc. (3)any photos sketches should have a scale built in. (4) Data point and uncertainties must be clearly visible.

III. DETAILS ON PROPOSED EXPERIMENT/CALCULATION

You will use this section to convince the reviewer that the project is feasible. Here you should describe in detail what measurements, calculations and or simulations will be made. In the case of an experiment you should provide a schematic of the apparatus and a circuit diagram for any electronics that you will need etc. When describing equipment give model numbers and any relevant specifications that seem appropriate. Use figures wherever possible to describe the proposed setup, electronics etc. If it is a computational project then describe the nature of the calculations, give a flow chart, specify in detail what the simplifications and assumptions that will be made, etc. How will you test that these assumptions are valid for the purpose you require.

The rules on figures are the same for any scientific document:

1. Figures must be numbered.

2. All the information must be easy to read. **The text in a figure (scales etc) should be large enough so that if the figure were reduced to a single column the text would be the size of the regular text in the document.**

3. Figures must have a caption which explains what is in the figure. **There should be enough detail in the caption to understand the figure without reading the text**.

4. Every figure must be referred to in the text of the proposal.

The figures do not need to be so polished as for a thesis but they must be easily read. You can include them using LATEX or simply append them at the end. If you append them at the end put the caption at the bottom of that page containing the Figure.

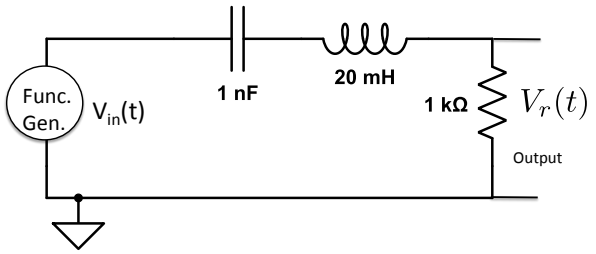

FIG. 1: Make sure the caption is detailed enough to fully understand the figure without having to read the main text. Resonant series LCR circuit. The properties of the circuit can be analyzed by (1) making a sudden change to an otherwise constant input voltage V_{in}^0 or by (2) driving the circuit with a sinusoidal input voltage $V_{in}(t)$. The voltage across the resistor is (output voltage from the circuit) is a measure of the current in the circuit.

IV. RESOURCES LIST

Provide a detailed list of all the resources you will need. e.g. any instruments, equipment materials and where it will come from. If it is going be bought then indicate the delivery time. Indicate what computing needs for the project and where they will come from.

V. PLANNED SCHEDULE

Provide a realistic schedule which includes when key components will arrive, when pieces will be designed and built, when first tests will be made, when measurements will be started and completed, when the analysis will be complete, when the thesis writeup will begin and when the first draft will be completed. You should give a draft to your supervisor at last two weeks before it is handed in to give him/her enough time to read it carefully and you enough time to revise it. Some of you already have a detailed schedule. Beware delivery times on equipment and all but the most common supplies often take 6 weeks.

[1] R.L. Garwin, L.M. Lederman, M. Weinrich, Phys. Rev. 105, (1957) 1415.

[2] *Muon Science* edited by S.L. Lee, S.H. Kilcoyne, and R. Cywwinski, published by SUSSP publications and the Institute of Physics U.K. (1999).