OELP (ID 3801) Proposal

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| **Title of the proposal** | Stochastic Resonance and Negative Inductance in square loop coils |
| **Proposing student 1** | Manikantan R S  (122101046) |
| **Proposing student 2** | Kevin R Jacob  (122101018) |
| **Faculty Mentor** | Dr Arvind Ajoy |
| **Background and Challenge Statement** | Stochastic resonance [SR] is a phenomenon where the addition of noise to a system improves some figure of merit related to the system (eg: signal to noise ratio, power etc). In this project, we will seek to measure the possibility of stochastic resonance in an inductor made with a ferrite core and a copper coil. The square-loop hysteretic behaviour of this ferrite core is closely related to a double well landscape, which is a bistable system. The second part of this project seeks to measure "Negative Inductance", which is expected when the system transitions via the metastable peak of a double well landscape. |
| **Deliverables** | * Characterising the negative inductance in the ferrite core, along with the simulation results. * Develop methodology to utilize the bistable behaviour of the square-loop ferrite coil for observing stochastic resonance. * Explore applications of stochastic resonance with this magnetic system. |
| **Methodology** | * Using a precise V-I converter the characteristics of the ferrite core will be determined. * The same setup will be used to observe SR in this magnetic core. |
| **References** | Continuation of the BTP work of Madhav Ramesh (B18) and Harivignesh (B19) |
| **Signature of the student 1** |  |
| **Signature of the student 2** |  |
| **Signature of the Faculty Mentor** |  |