Proposal Summary

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I am planning to focus on two projects during the one year period of the fellowship:

(1) Develop a selection for ν_e candidate events from BNB neutrino data for the low energy excess analysis in MicroBooNE. This is MicroBooNE's flagship analysis. I will lead a working group based at Fermilab to improve the event reconstruction and cosmic removal, in order to obtain a cut-based event selection with high efficiency and purity.

(2) Understanding the unexpected high rate of single photoelectrons (SPE) observed in Micro-BooNE. This is an important task related to the fundamental working principle of large LArTPC detectors. A timely resolution of this problem is crucial for the design of the DUNE detectors. I have developed a preliminary model to explain this high rate. Driven by this model, I am proposing several test runs using the MicroBooNE and LArIAT detectors to find the source of this high SPE rate.