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 $\nu_e$ 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 MicroBooNE. 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.