**Bhabha Atomic Research Centre**
**BARC Training School, Mumbai**

**MINI-PROJECT PROPOSAL FORMAT**

| **Name of Trainee:** | | **Discipline** | Physics |
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**Title of Mini-Project:**

Measurement of cosmic muon generated neutron background relevant for physics using reactor neutrinos

**Guide's Details**

| Name & Designation: | Vishwajeet Jha, SO-G | | |
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| Division / Group: | NPD, PG | | |
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**Brief Scope of Work**

Reactors provide a copious source of pure electron antineutrinos that can be utilized for probing several fundamental physics aspects beyond the Standard Model. One of the primary goals of reactor neutrino measurements specially at short distances is to confirm or exclude the existence of sterile neutrinos. However, because of very low interaction cross section of neutrinos their detection is challenging. Further, in the measurement at short distances at reactors such as, Dhruva, Apsara-U, these neutrinos have to be detected in the presence of large background mainly consisting of neutrons and gammas. For the detectors placed over ground the background generated from the cosmic muons also becomes very important.

In the present project, cosmogenic background will be measured using two square shape large area plastic scintillator (PS) detectors with four sided readout. The techniques of event reconstruction for obtaining position information for this PS shape will be developed. The effect of lead and boronated polythelene shielding material on the background will be studied. The project will involve a hands-on experience of working with plastic scintillator detectors, pulse shape digitizers and computational analysis techniques for reconstruction of events. The result of the project work will be helpful for better quantification of the cosmic muon generated background due to presence of shielding material.

Vishwajeet Jha.
SO-G, NPD.

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**Signature and Seal of Head of Division / Coordinating Official**

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