Lee Teng Summer Intern Mentor Volunteer Form

Name of mentor: **Dr. Kamlesh Suthar**

Name of administrative assistant for mentor: Loretta Cokeley, MED

Argonne division: APS Engineering Support (AES)

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Project description:

**Study of Thermo-elastic wave propagation in material**

The phenomenon of acoustic wave propagation in matter due to rapid heating at nanoscale time is due to thermo-elasticity. Rapid and localized heating such as pulsed laser interaction with materials can result in abrupt expansion that causes the generation of pressure wave in the material away from the heating source. This wave propagation often occurs less than the energy required for thermal ablation. Hence, the analysis of these acoustic waves can give physical information about the material properties such as structure integrity, sound wave speed, spallation wave propagation characteristics etc. The same phenomenon we can use in the to detect the interaction of pulsed photon/electron beam with material. At APS we are developing techniques that will measure the acoustic wave generated due to interaction of pulsed beam with materials. To understand the thermo-elastic phenomena in different materials, we have simulated using finite element analysis software COMSOL. This simulation required thermal physics to be coupled with wave propagation equation. Student is expected to run simulations and develop understanding about subject matter. If time permits, the student is also expected to work on experimental part and compare simulation results.

List any skills a student might have that are of particular interest:

1. Solid Modeling
2. Engineering Mechanics and Mechanics of materials
3. Physics, general chemistry
4. Engineering Mathematics

List any special safety training needs you would have for your Lee Teng intern:

1. General Lab Safety
2. General Chemistry