

**U.S. DEPARTMENT OF ENERGY
NUCLEAR ENERGY RESEARCH INITIATIVE
ABSTRACT**

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Proposal No.: 99-0039

Institution: Argonne National Laboratory

Collaborators: Commissariat a 'L Energie Atomique

Title: Measurements of the Physics Characteristics of Lead-Cooled Fast Reactors and Accelerator Driven Systems

Several recent studies in the US and worldwide have indicated a strong interest in the potential development of lead cooled critical and sub-critical systems. The neutronic characteristics of a lead cooled fast spectrum system are believed to be relatively poorly known: difficulties arise both from nuclear data uncertainties and from methods related deficiencies. The French Atomic Energy Commission (CEA) has recognized this situation and has launched an ambitious program aimed at measuring the physics characteristics of lead cooled critical and subcritical systems in an experimental facility located at the Cadarache Research Center. A complete analytical program is associated to the experimental program and aims at understanding and resolving potential discrepancies between calculated and measured values. Argonne National Laboratory (ANL) has unique expertise in these areas. CEA has invited ANL teams to contribute in the experimental design, measurements, and analysis tasks. In exchange of ANL's expertise, CEA would make all facilities and experimental results available at no charge.

This three-year project has three critical outcomes:

1. High quality experimental data representative of the physics of lead cooled cores will be made available to the US programs.
2. The US neutronics codes will be validated for calculating lead cooled cores, thus reducing the margins the design teams need to incorporate in their assessments.
3. Potential deficiencies in US nuclear data and analysis tools will be identified.