Facilitating *In-Situ* Analytics for Complex AMR-based Simulation Workflows

**Objective**
- Manage dynamic data processing requirements at extreme scales using coordinated algorithm, middleware and resource layer adaptations

**Target Applications**
- Dynamic AMR-based simulations such as the Polytropic Gas simulation for modeling tokomak edge plasma (part of Chombo developed by LBNL)

**Data Management Challenges**
- Large and dynamically changing data volumes
- Dynamic and imbalanced data distributions
- Heterogeneous and dynamic resource (memory, CPU, etc.) requirements

**Impact**
- Accelerated the data-to-insights process by up to 75% for a large-scale AMR-based simulation-analytic workflow
- Reduced overall data movement between the AMR-based simulation and in-situ analytics by 45%