Contribution ID: **25257** Type: **Extended Abstract**

Robust Model Identification for Pressurized Water Reactor Systems using Sparse Identification of Nonlinear Dynamics

Monday, 3 November 2025 13:30 (15 minutes)

This research presents the first application of Sparse Identification of Nonlinear Dynamics (SINDy) to nuclear reactor model identification, specifically targeting Pressurized Water Reactor systems. The identified models provide a foundation for advanced control systems, predictive diagnostics, and operational optimization while maintaining the interpretability required for nuclear safety applications. The approach addresses traditional first-principles modeling limitations by discovering governing equations directly from measurements without requiring simplifications that may compromise predictive accuracy during complex operational transients.

Technical Track

Reactor Physics

Primary authors: Prof. CAMMI, Antonio (Khalifa University); Dr INTROINI, Carolina (Politecnico di Milano); Mr RIVA, Stefano (Politecnico di Milano); Prof. WANG, Xiang (Harbin Engineering University); Prof. FOULON, Francois (Khalifa University); Prof. ALRWASHDEH, Mohammad (Khalifa University)

Session Classification: Reactor Physics