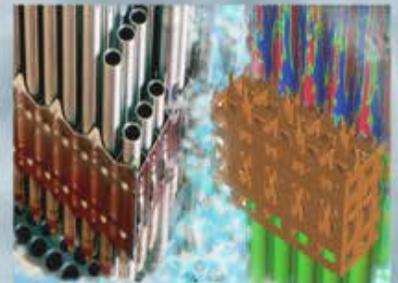
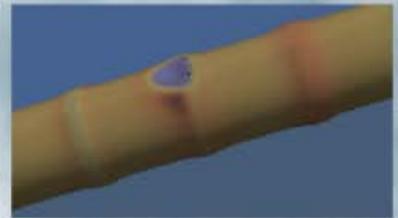
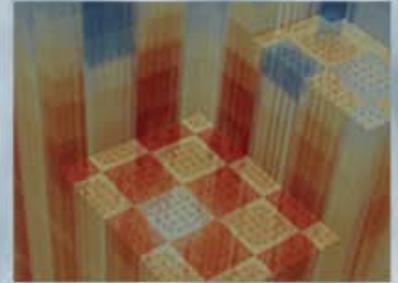


# CASL Program Highlights October 2014

**Douglas Kothe**  
*Oak Ridge National Laboratory*

**October 31, 2014**



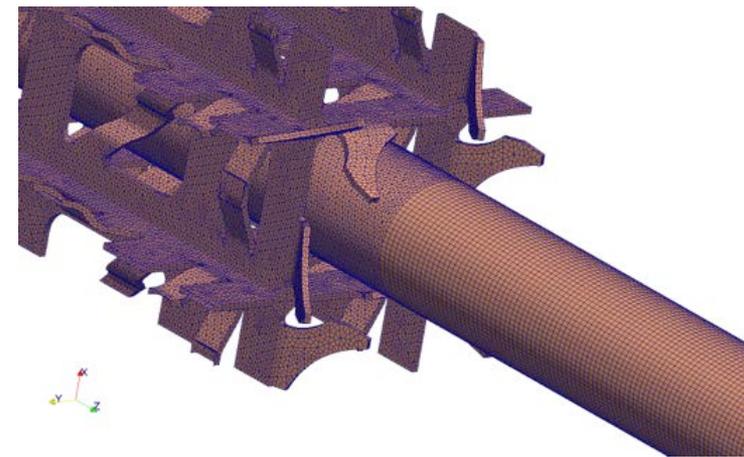
# Native Conjugate Heat Transfer (CHT) in Hydra-TH

## Purpose

- Implement native CHT capability within Hydra-TH (no need to couple to external conduction solver)

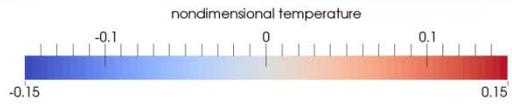
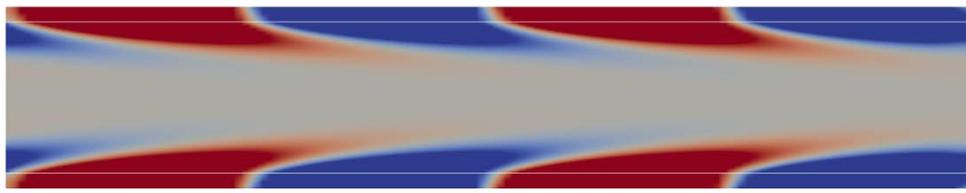
## Features

- Automated fluid-solid interface detection for arbitrarily complex reactor geometries
  - Avoids time-consuming, error-prone, user identification of CHT interfaces
- Automatic boundary condition specification at fluid-solid interfaces
- Heat flux continuity at fluid-solid interfaces

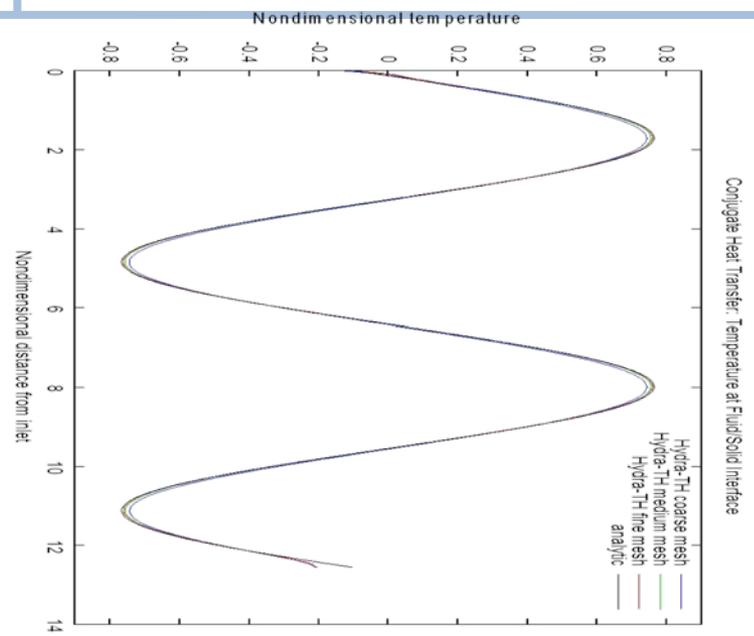


## Results

- Heat conducting through solid walls into fully-developed plane channel flow
- Excellent agreement with analytic CHT solution



fluid-solid interface

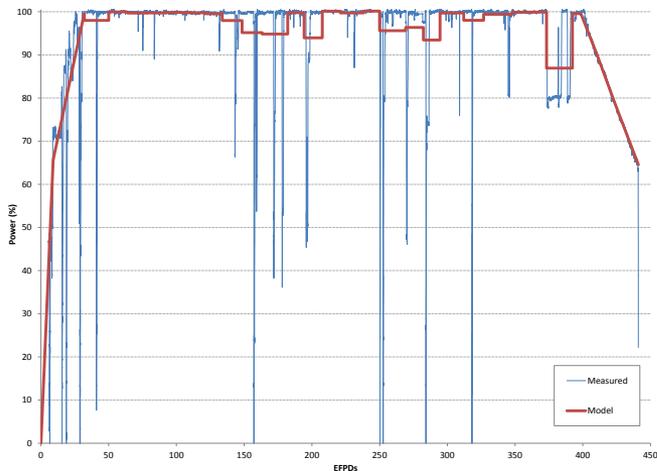


Key personnel: A. Stagg (ORNL), M. Christon (LANL)

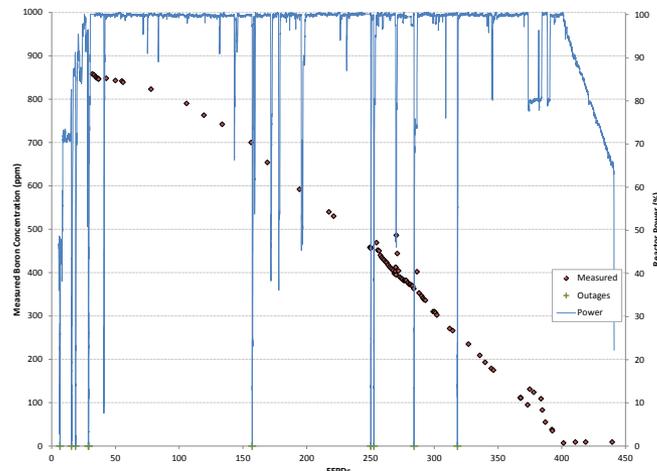
# Core Physics Progression Problems Specifications Completed

- Addition of Problems 9 and 10 to the public benchmark problem specification
- Problem 9 includes Cycle 1 operating history and critical boron measurements released by TVA
  - Cycle depletion data reduced to 30 depletion steps
  - No incore flux map data
- Problem 10 includes a representative core fuel shuffle map for Cycle 2
  - Needs revision once TPBAR and Cycle 2 startup information is available

- #1 2D HZP BOC Pin Cell
- #2 2D HZP BOC Lattice
- #3 3D HZP BOC Assembly
- #4 3D HZP BOC 3x3 Assembly CRD Worth
- #5 **Physical Reactor Zero Power Physics Tests (ZPPT)**
- #6 3D HFP BOC Assembly
- #7 3D HFP BOC Physical Reactor w/ Xenon
- #8 **Physical Reactor Startup Flux Maps**
- #9 **Physical Reactor Depletion**
- #10 Physical Reactor Refueling



Problem 9 Power History



Problem 9 Boron Letdown

	H	G	F	E	D	C	B	A
8	H-14	N-13	128*	R-8	128	N-8	L-15	F-11
9	N-3	104	A-9	104 8	B-11	128*	48	C-4
10	128*	G-15	E-15	D-7	104 8	B-7	48	G-10
11	H-1	104 8	J-12	128*	N-2	128	48	F-13
12	128	E-14	104 8	P-3	A-6	104 4	B-4	
13	H-3	128*	J-14	128	104 4		P-6	
14	R-5	48	48	48	M-14	K-2		
15	L-10	M-13	F-9	C-10				

IFBA|WABA or Previous Cycle 1 Location  
 \* 132 inch IFBA (All others 120 inch)

Problem 10



# CASL Board of Directors Meeting

Washington, DC September 30, 2014

- **Attended by all 14 CASL Board members, DOE senior personnel, and CASL senior leadership**
  - DOE attendees: Mike Knotek (Deputy Under Secretary for Science and Energy); Ellen Williams (Senior Advisor, Office of the Secretary of Energy); Walt Kirshner (Argonne National Laboratory); Dennis Miotla, Alex Larzelere, Marius Stan (Office of Nuclear Energy)
- **Agenda items and topics addressed**
  - CASL 4th Annual Performance and Renewal Review (in Aug 2014) by DOE NE
  - CASL status & outlook: CASL's Virtual Environment for Reactor Applications (VERA) is on track
  - CASL technology deployment and licensing strategy: VERA will be licensed in FY15
  - Recent review and advisory input received by CASL from its Science and Industry Councils
  - Direct interactions with key DOE personnel on findings and recommendations gleaned from the Aug 2014 DOE review of CASL's Renewal Application for a 2nd five-year period of execution (Phase 2)
- **DOE NE reported to the Board their recommendations (to DOE) that CASL go forward into a Phase 2**



# CASL Activities

## CASL Collocation

- FY15 Planning (all focus areas)
- DOE Reportable Milestone Review
- FMC (Fuel Materials & Chemistry) Meeting
- Technology Control Plan Review
- VERA-EDU Requirements
- RIA (reactivity insertion accident) Progression Problems
- Hydra Super User
- Rejuvenation Discussion
- Mamba Update: Tutorial on the development of MAMBA
- CPI's (Challenge Problem Integrators) Review of FY15 Work Scope
- TVA Test Stand



## VOCC Tours

10 tours for  
October 2014

- Ann Harrington, Dep. Administrator for Defense Nuclear Nonproliferation National Nuclear Security Administration
- Pete Tseronis, CTO, DOE
- United Technologies Research Center
- UK National Nuclear Laboratory
- Korean Atomic Energy Research Institute

## Meetings

- FMC (Fuel Materials & Chemistry) Focus Area Workshop, October 30