

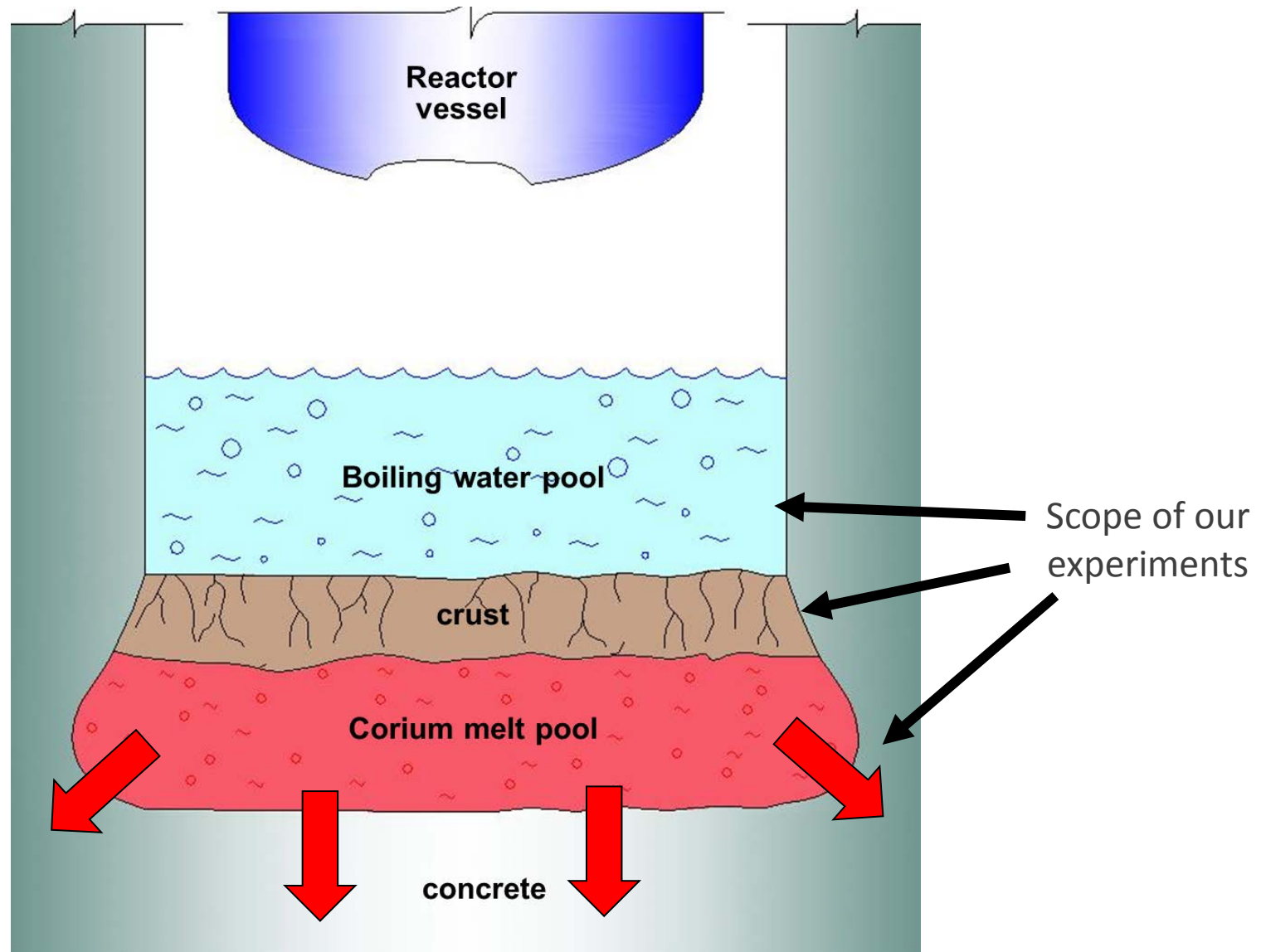
Corium/concrete Interaction Experiments for Severe Accident Code Validation

S. Lomperski, M. T. Farmer, C. Gerardi

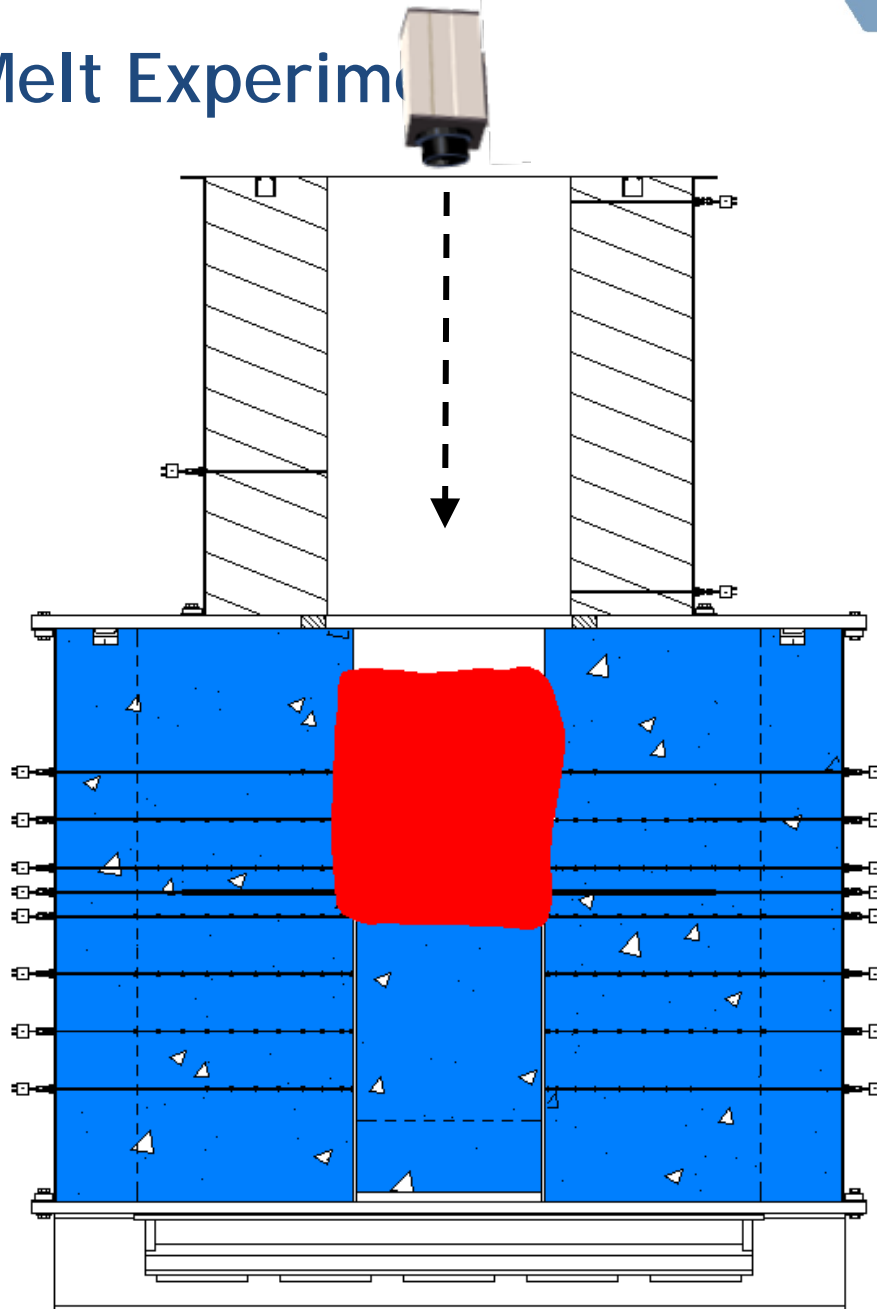
Presented at:

Politecnico di Milano
17 Maggio 2013

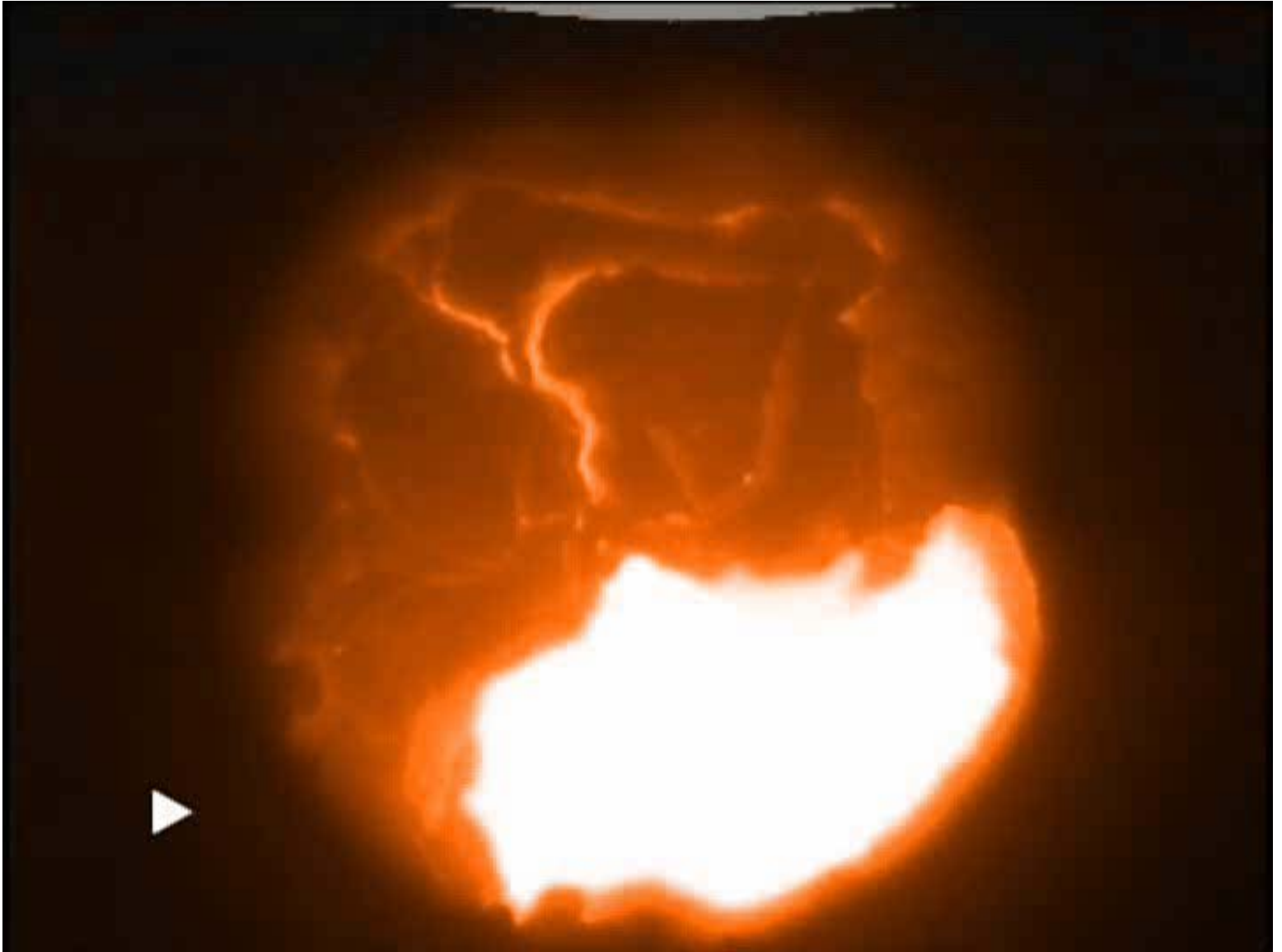
Ex-vessel accident geometry



Core Melt Experiment

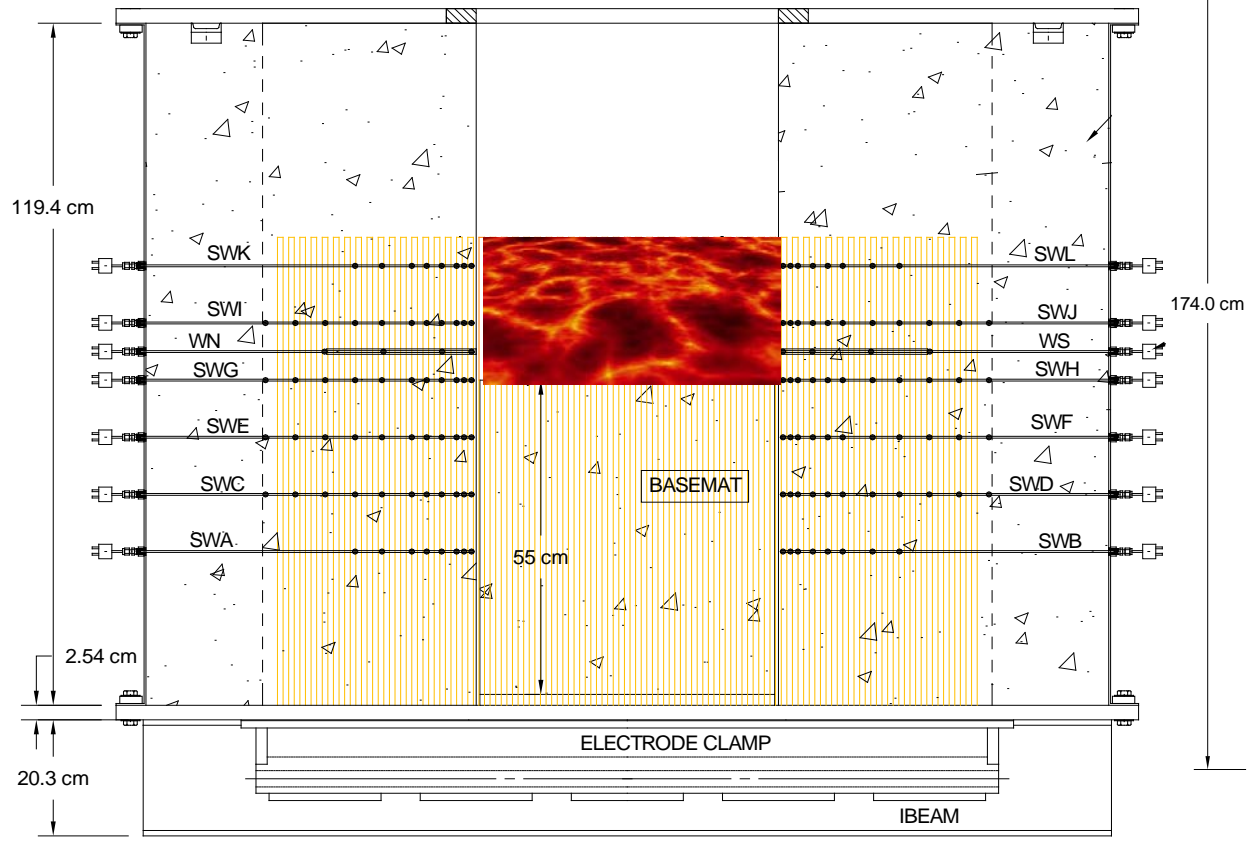


Melt surface top view

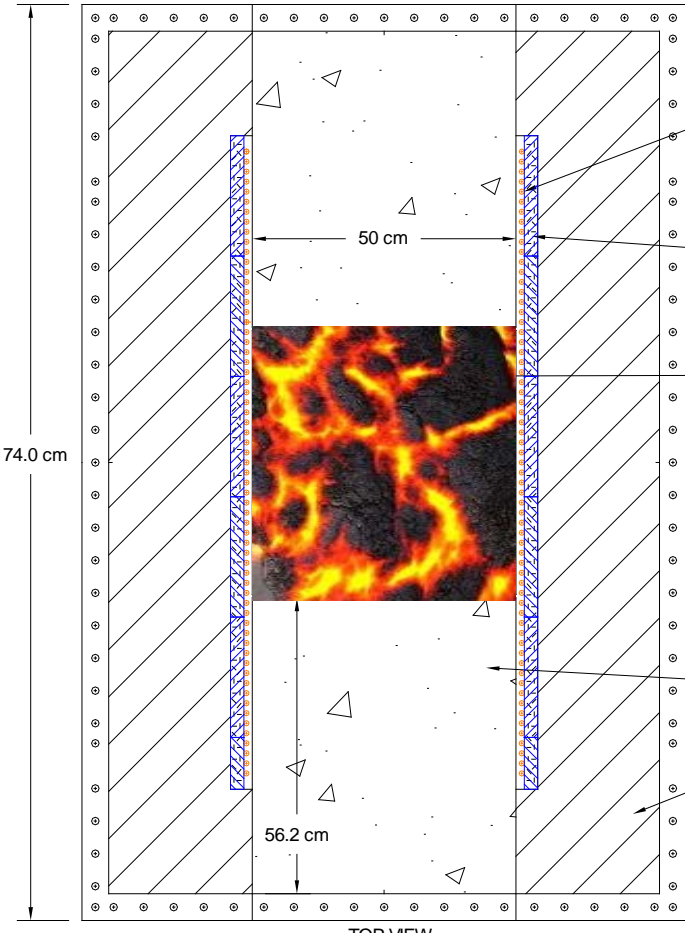


CCI test section

Side view

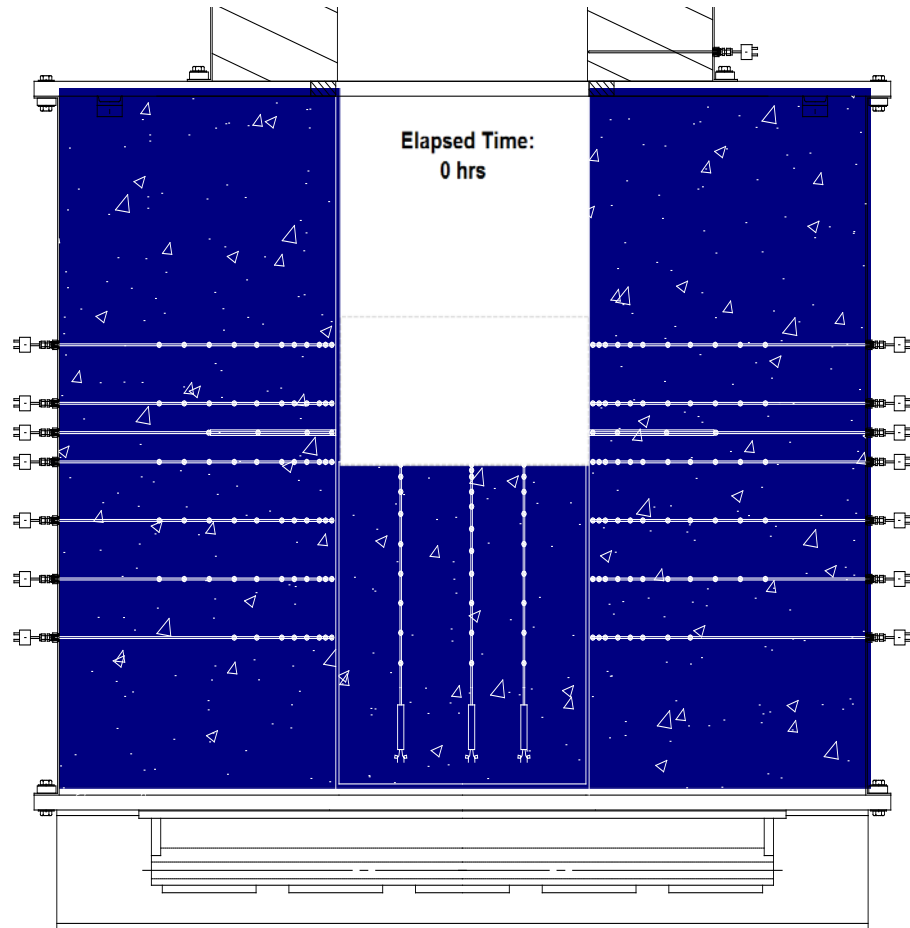


Top view



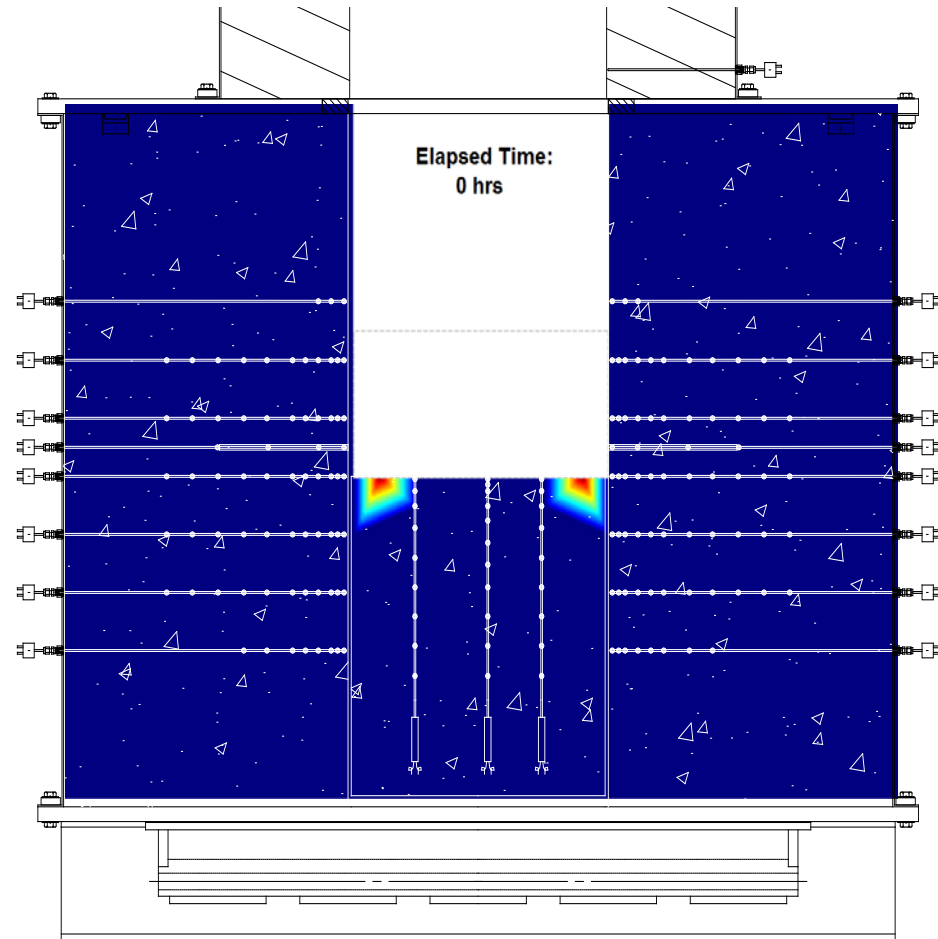
CCI-2

LCS Concrete



CCI-3

Siliceous concrete



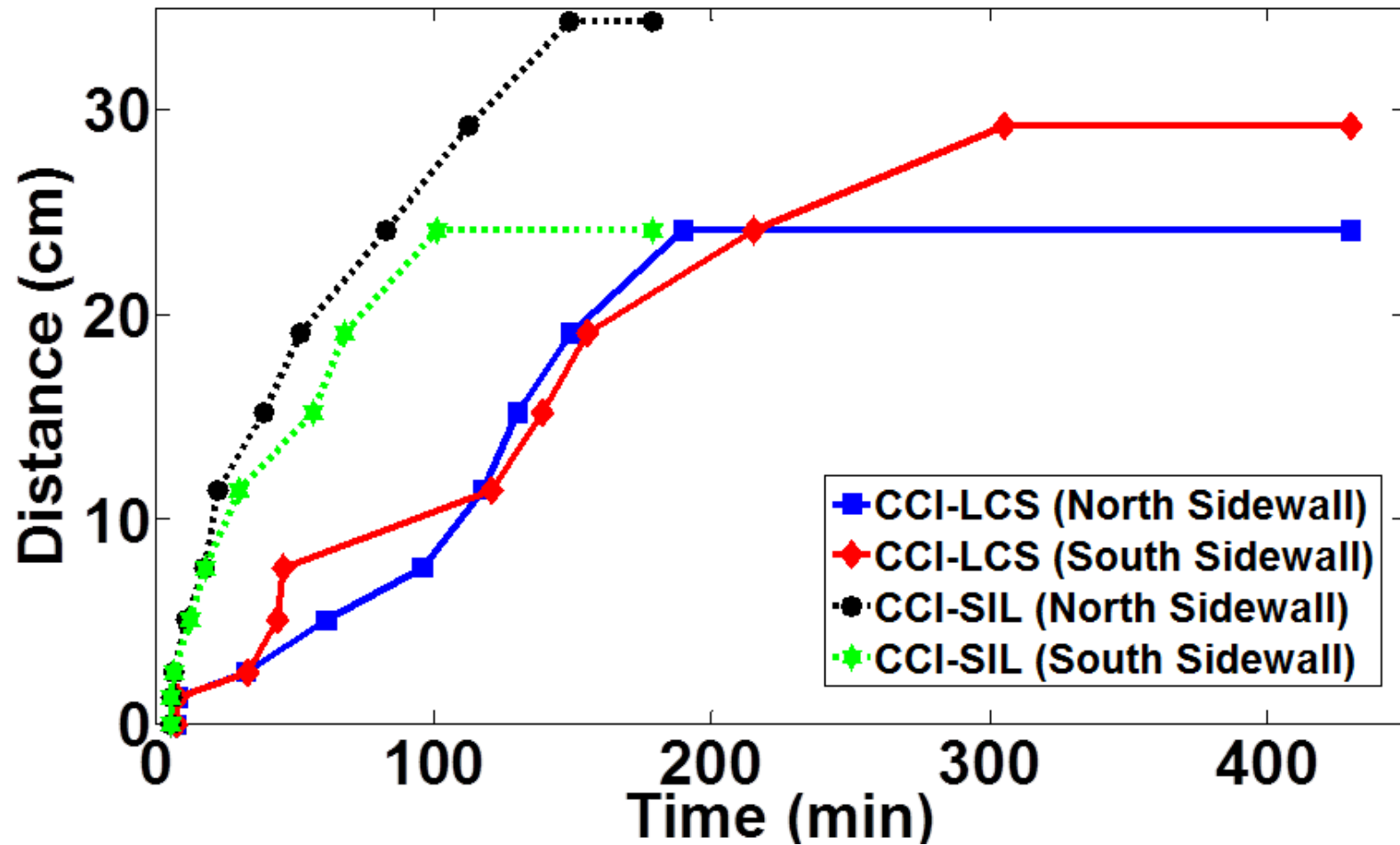
Clear difference in the power split



Post Test



Visual version measure?





Interface Close-ups

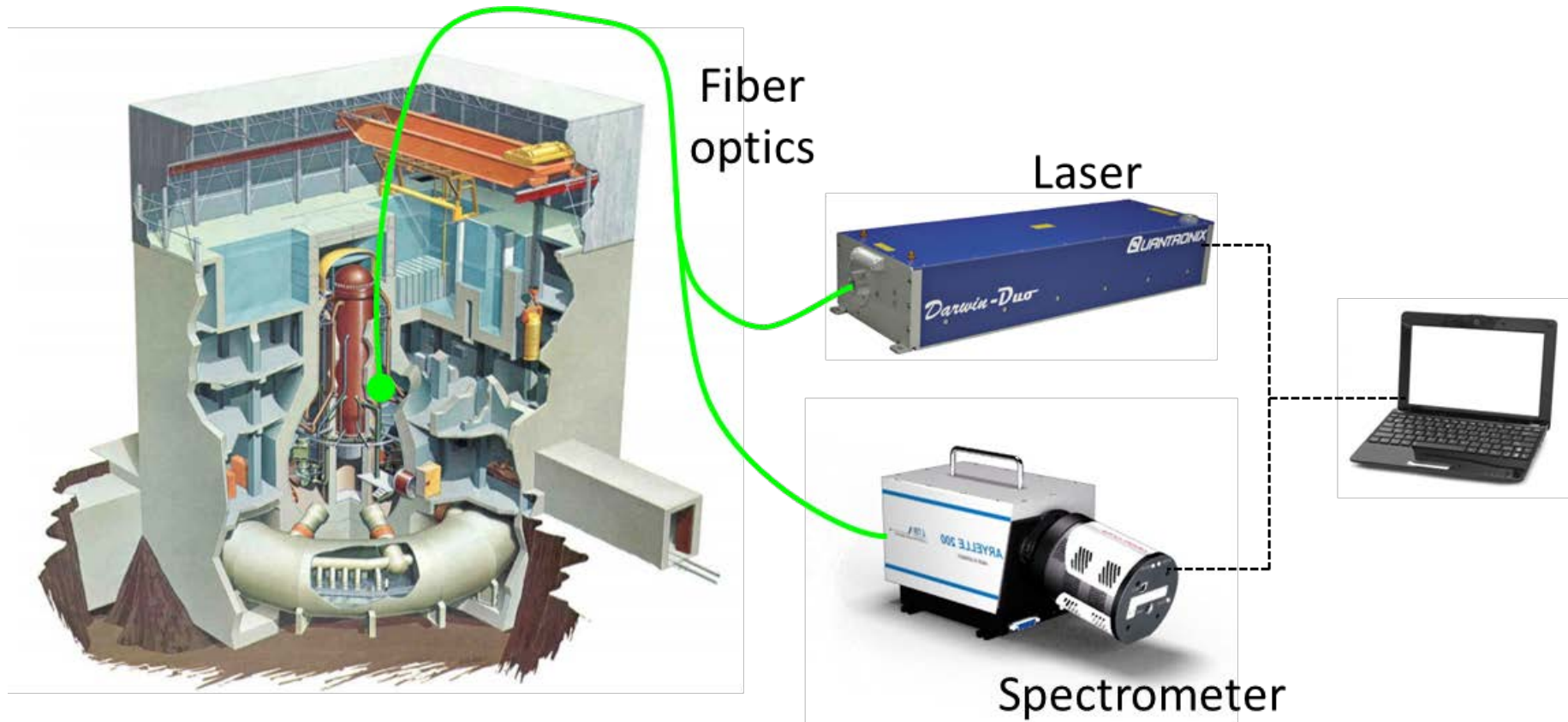
CCI-1 SIL



CCI-2 LCS

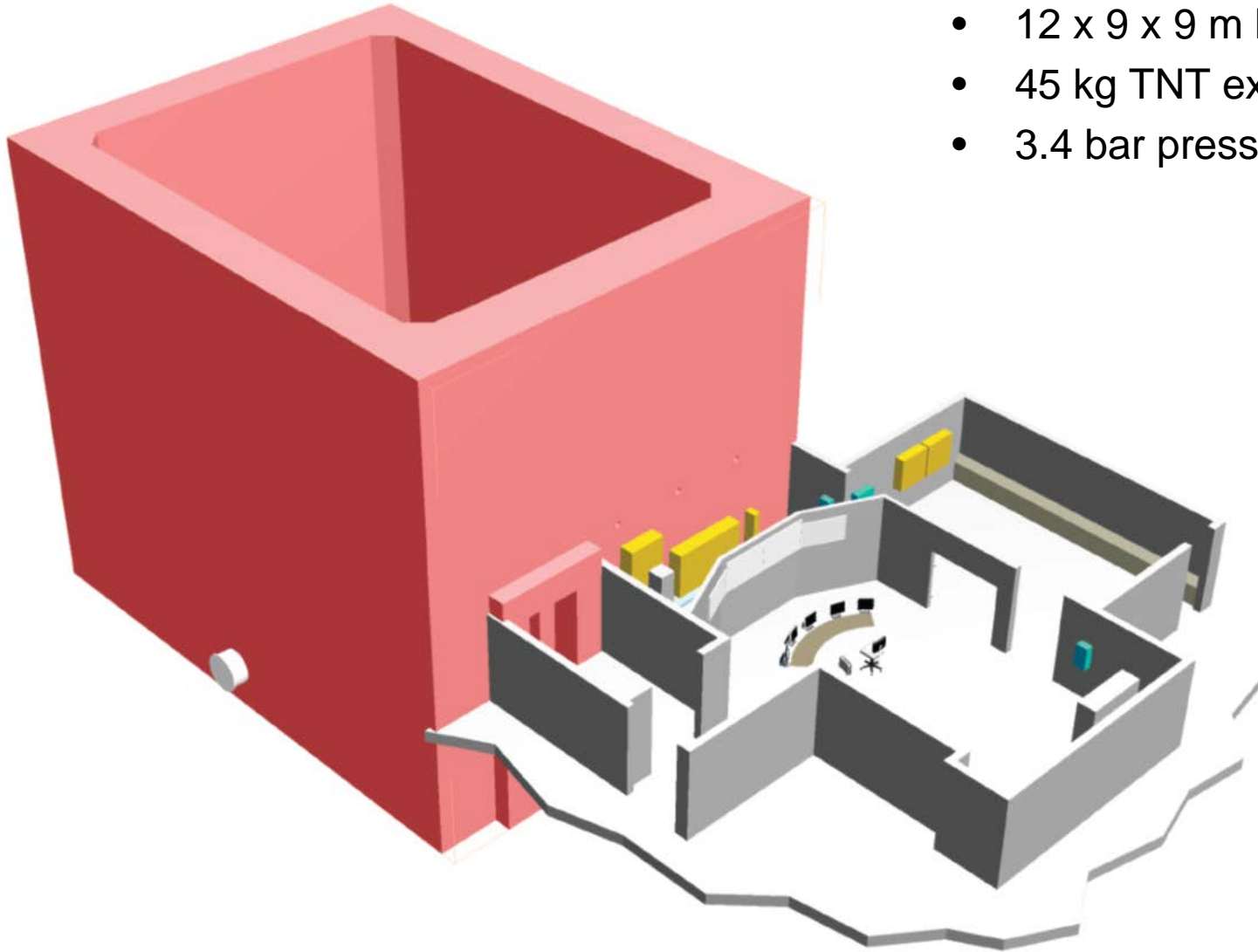


Chemical Analysis with Laser Induced Breakdown Spectroscopy



Test Facility in Reactor Containment

- 1.2 m thick walls
- 12 x 9 x 9 m high
- 45 kg TNT explosion rating
- 3.4 bar pressure rating



Most Experiments are Successful, but.....



CCI Test Parameters

| | CCI-1 | CCI-2 | CCI-3 | CCI-4 | CCI-5 | CCI-6 | CCI-7 |
|--------------------------------------|--|--|---|--|---|---|---|
| Corium | PWR 100 % oxidized 8% concrete | PWR 100 % oxidized 8% concrete | PWR 100 % oxidized 15% concrete | BWR 78 % oxidized 7.7% SS 10% concrete | PWR 100 % oxidized 15% concrete | PWR 100% Oxidized 6% concrete | PWR 100% Oxidized 6% concrete |
| Concrete type | SIL (US-type) | LCS | SIL (EU-type) | LCS | SIL (EU-type) | SIL (EU-type) | SIL (EU-type) |
| Basemat cross- section (cm) | 50 x 50 | 50 x 50 | 50 x 50 | 50 x 40 | 50 x 79 | 70 x 70 | 70 x 70 |
| Initial mass (kg) | 400 | 400 | 375 | 300 | 590 | 900 | 1000 |
| Melt depth (cm) | 25 | 25 | 25 | 25 | 25 | 28 | 30 |