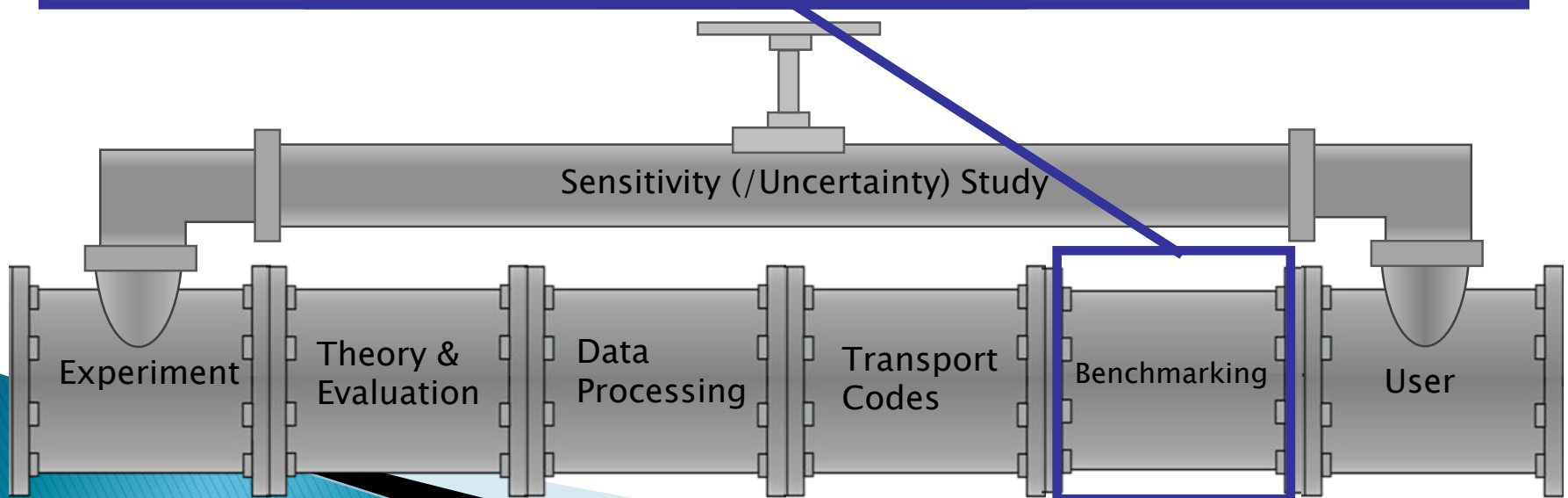
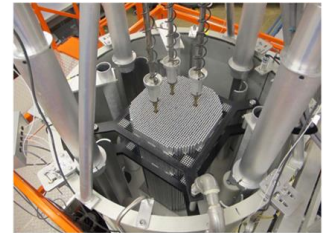


# Benchmarking

Validation that analytical method adequately represents reality for a given application. Integrated test of

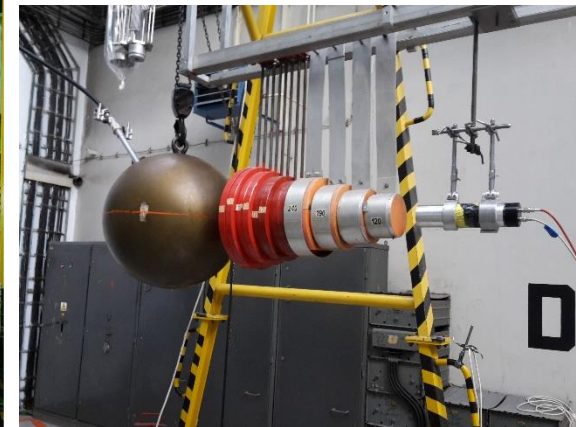
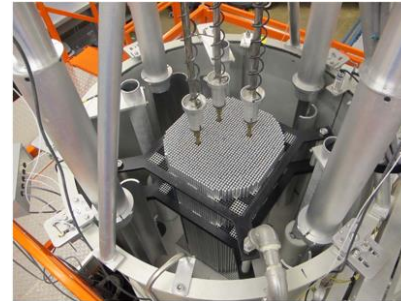
- Evaluated nuclear data
- Nuclear data processing codes
- Transport codes



# Integral Experiments

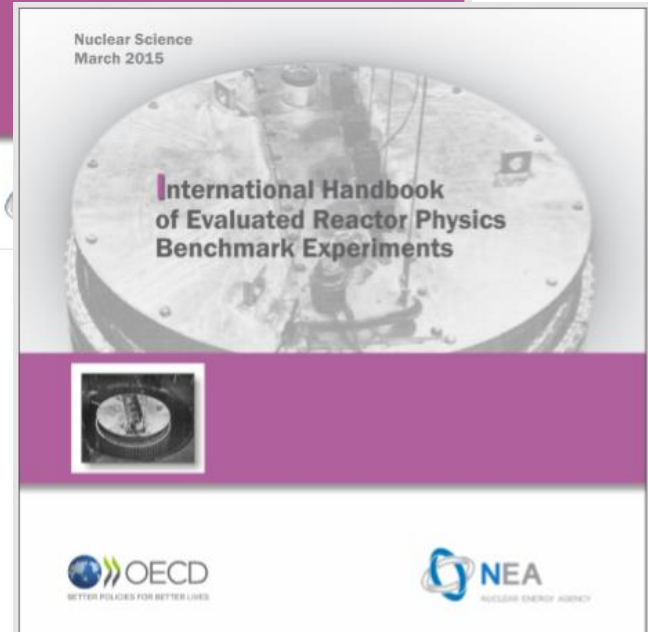
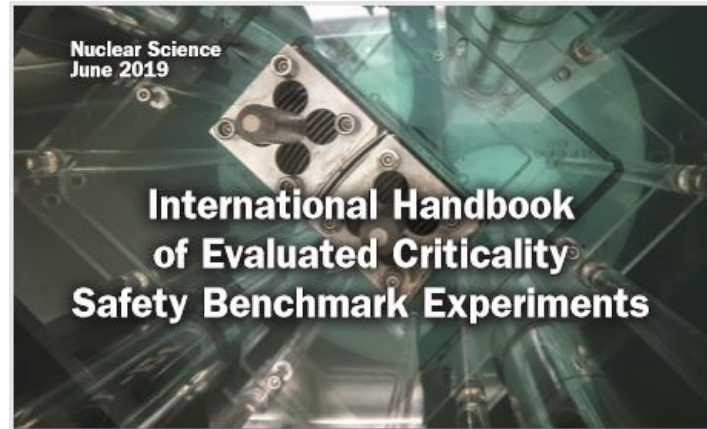
## Basic data for benchmark development

- ▶ Critical assemblies
- ▶ Subcritical assemblies
- ▶ Engineering mockup critical assemblies
- ▶ Reactor startup exp.
- ▶ Reactor operation data
- ▶ Shielding experiments



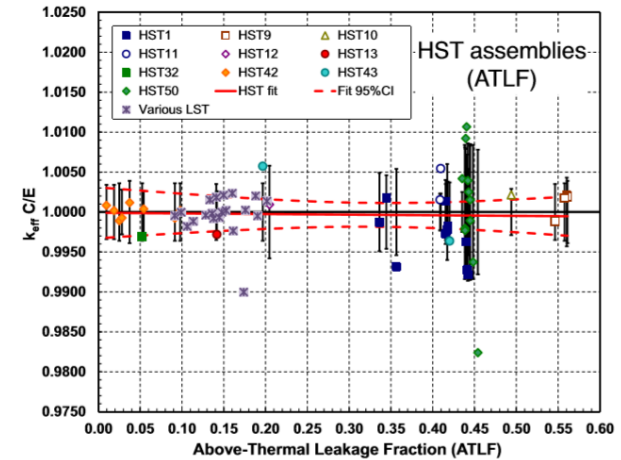
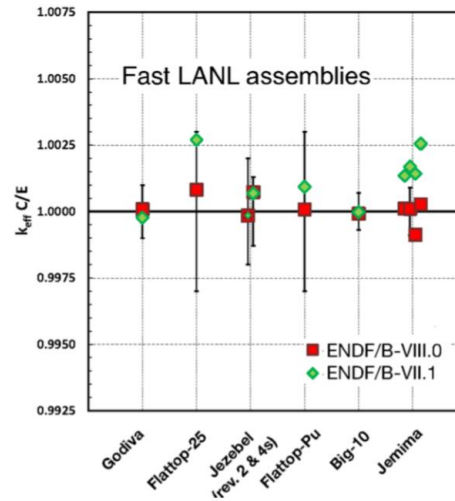
# Benchmark Evaluation

- ▶ Well characterized experiments
- ▶ Evaluate experimental uncertainties
- ▶ Bias and uncertainty for model simplifications
  - Geometry simplifications
  - Room return
  - Material impurities
- ▶ Describe benchmark model
- ▶ Sample calculation results
- ▶ Disseminate for broader use
- ▶ Established Handbooks
  - ICSBEP (criticality safety)
  - IRPhEP (reactor physics)
  - SINBAD (shielding)

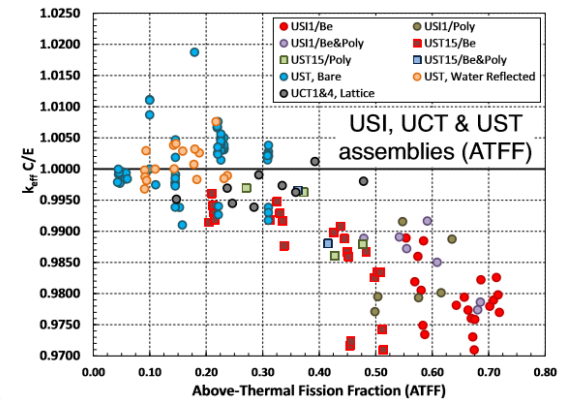
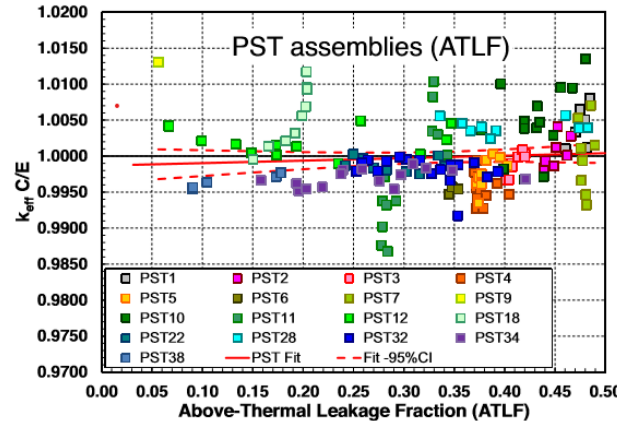
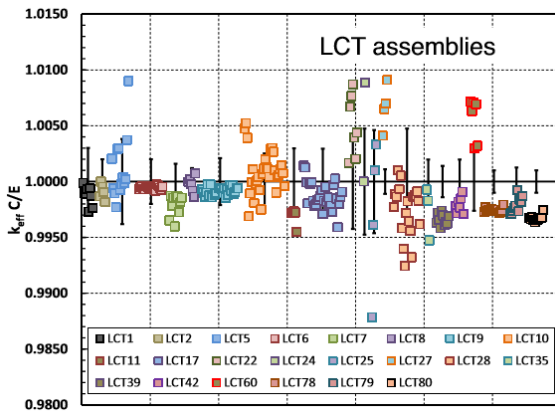


# Validation Testing

- ▶ Suite of benchmarks to validate evaluated nuclear data for applications
- ▶ Provides feedback to measurement and evaluation community
- ▶ Drives improvements in evaluated nuclear data

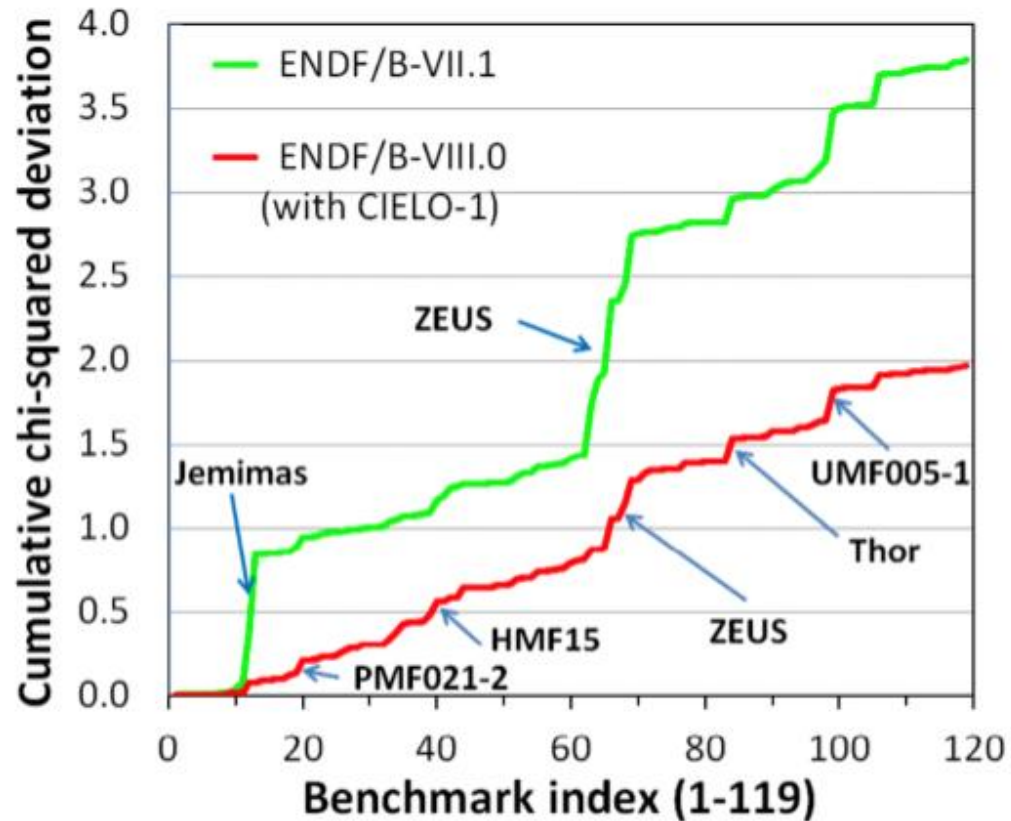


Ref: D. A. Brown, et al., *Nuclear Data Sheets*, 148, 1 (2018)



# Validation End Product

- ▶ Ultimate goal is to improve evaluated nuclear data for applications
- ▶ Example shows improvement in fast metal system for ENDF/B-VIII.0
- ▶ Provides end-users confidence they can use codes and nuclear data for their applications



M.B. Chadwick et al, Nuclear Data Sheets 148, 189 (2018)