IER 500: AWE-LLNL Measurement Campaign at DAF

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AWE-LLNL Measurement Campaign at DAF

LLNL hosted AWE scientists at DAF during FY24

- First trip: Oct 23 – Nov 3, 2023
- Second trip: Feb 26 – Mar 8, 2024

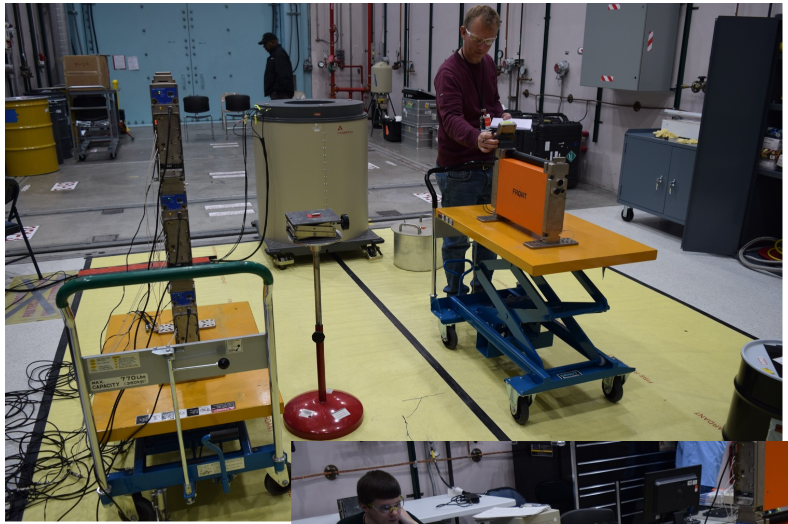
Performed several measurements of classified and unclassified radiation test objects (RTOs)

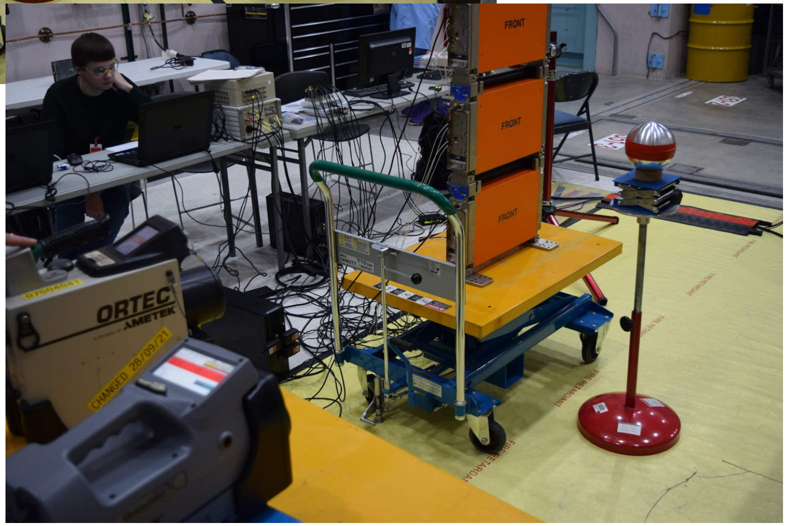
Shipped LEMC back to AWE for repair / equipment upgrade

Accomplishments

The AWE-LLNL team setup and performed several measurements

- Multiple unique Pu and HEU RTOs were measured (20+ different builds)
- Several neutron and gamma-ray detection systems used
- Hot spot mapping of RTOs were performed



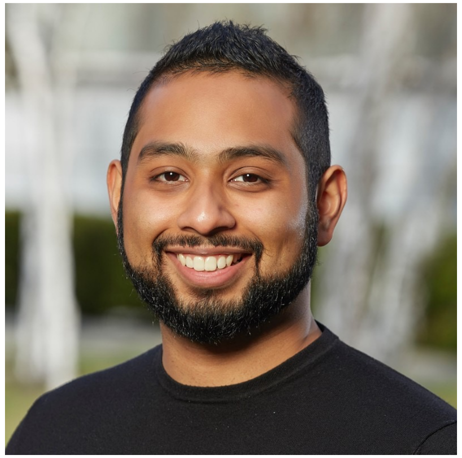


New Developments at DAF

LLNL DAF operations leadership

Sam Varghese is the new Nuclear Material Operations (NMO) Project Lead

Joe O’Brien has taken on an expanded management role for LLNL DAF project management in his capacity as the Global Security Associate Program Leader (APL) for Integrated Operations



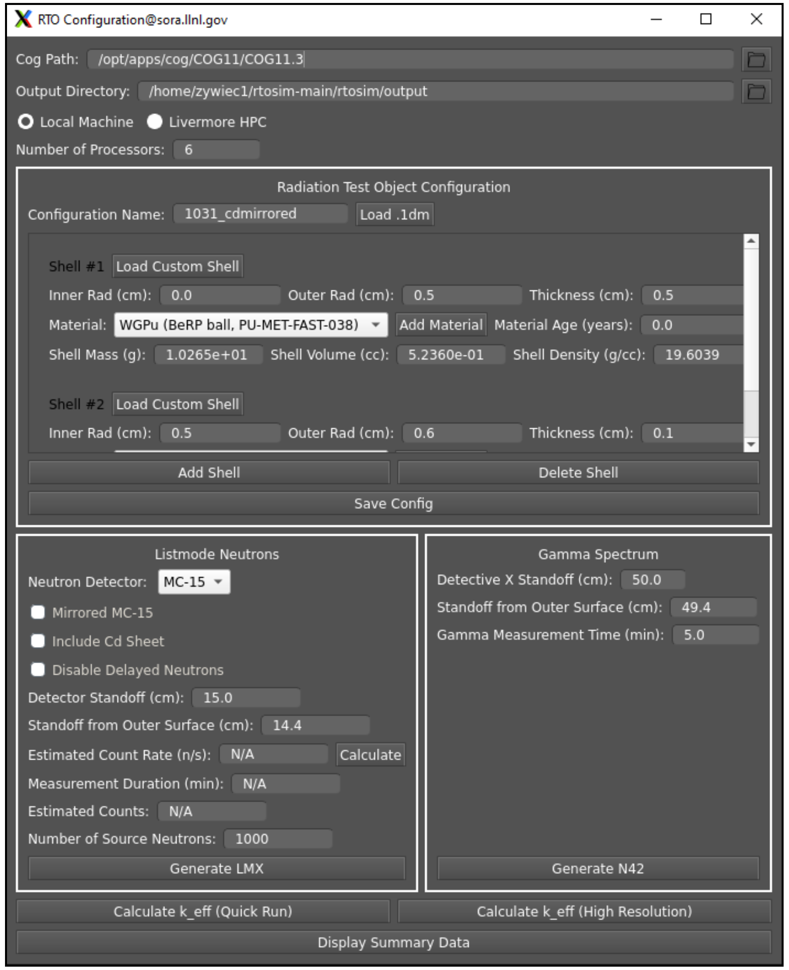
Sam Varghese

Joe O’Brien

New Capabilities at DAF

LLNL deployed new **RTOSim** software package at DAF during FY24

- Uses LLNL's new **COG12** Monte Carlo radiation transport code
- Automatically generates **(a,n)** and **spontaneous fission** neutron sources and performs full time-dependent transport
- Generates **.lmx** (neutron) and **.n42** (gamma) detector files
- Incorporates arbitrary 3D geometry and imaging capabilities
- Experimentally validated at DAF



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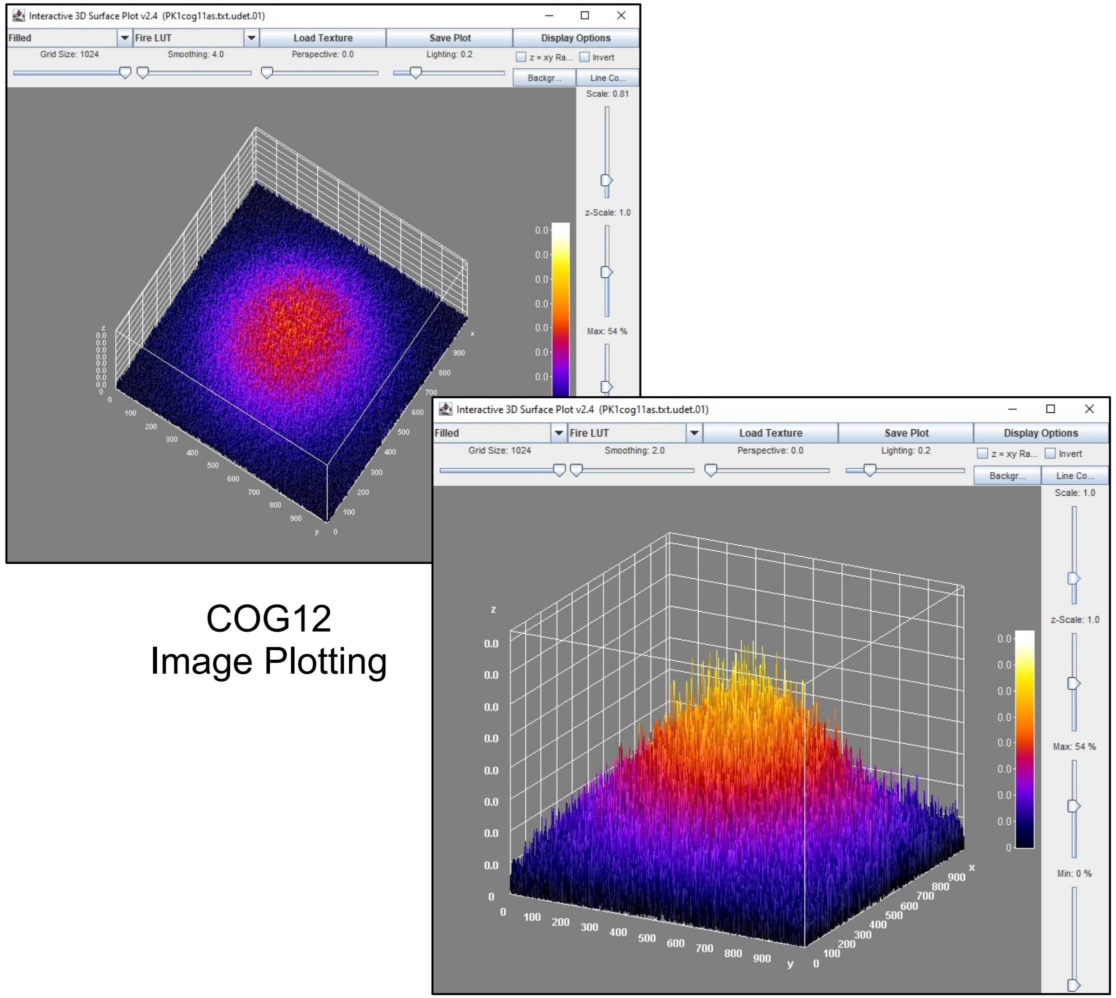
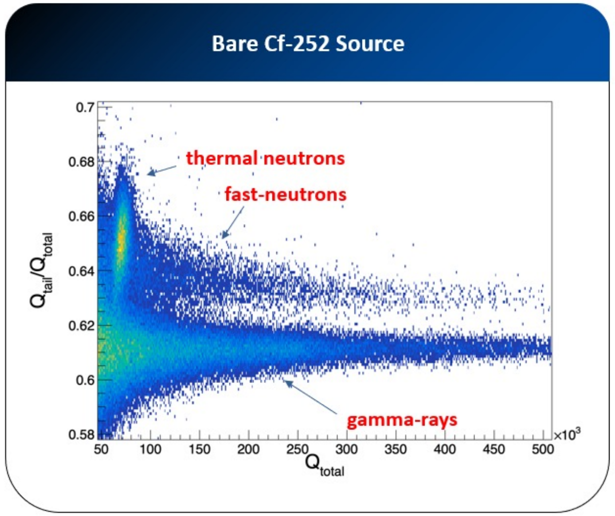


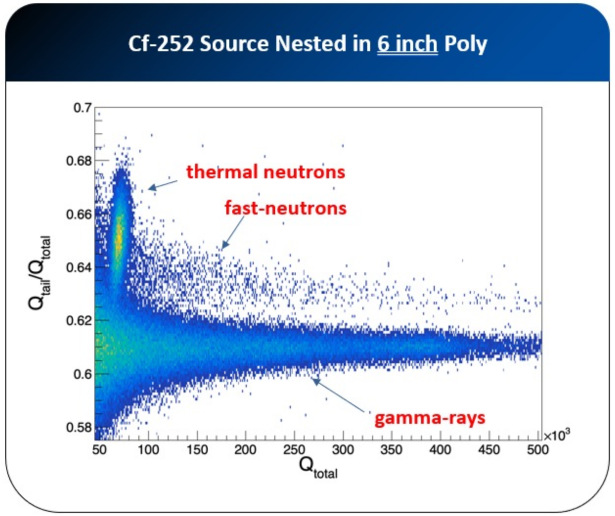
COG12
Image Plotting

New Capabilities at DAF

LLNL also deployed new neutron and gamma detectors during FY24

Prototype lithium-doped plastic scintillator system (**MC-Lite**) – neutron and gamma list-mode data





MC-Lite

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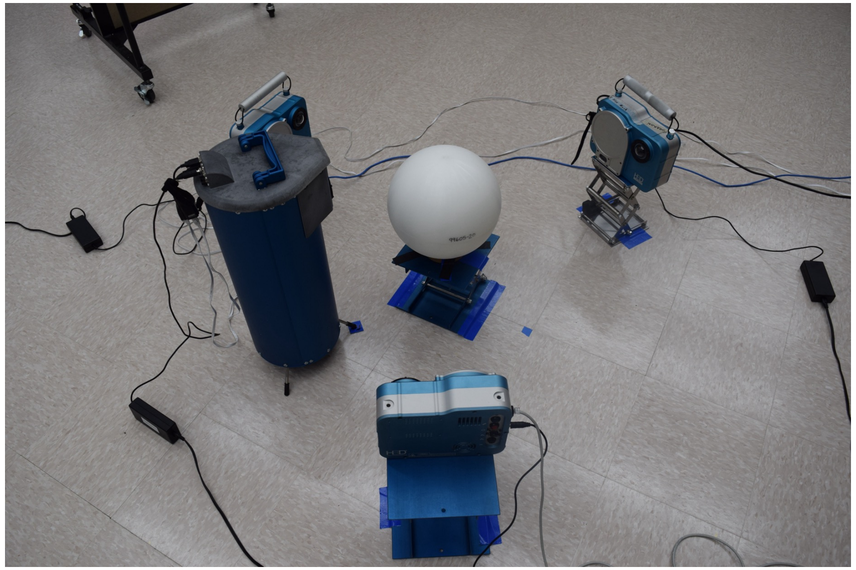
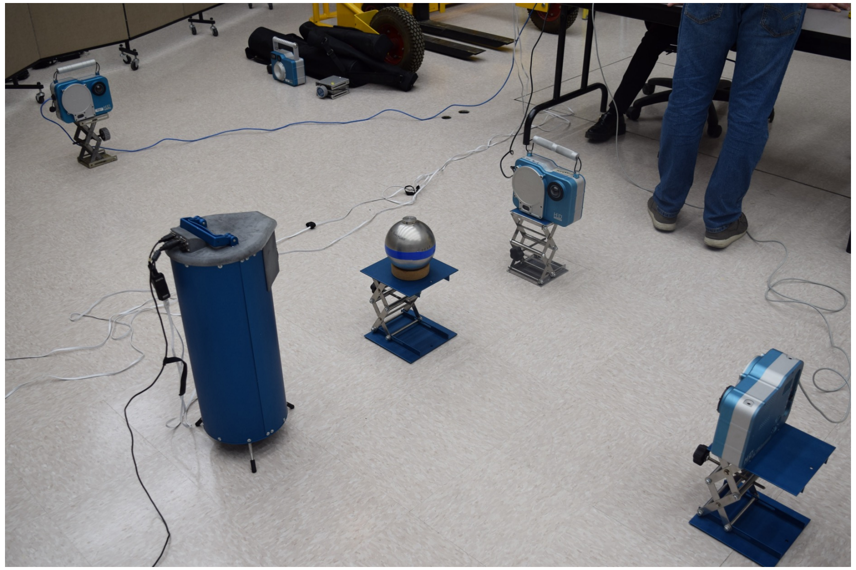
Prototype CZT gamma system from H3D





Future Work

- AWE-LLNL trip for FY25 is scheduled.
  - Several new high-fidelity RTOs have been designed for the upcoming trip.
  - AWE-LLNL partnership remains strong as LLNL capabilities at DAF continue to grow.

Special Thanks

Dr. Angela Chambers and the NCSP Management Team for supporting these measurements and facilitating material transfers

Scarlet Mitchell, LLNL

AWE

MSTS

LANL-NCERC team