

# LLNL FY22 NCSP Overview Task Manager Report

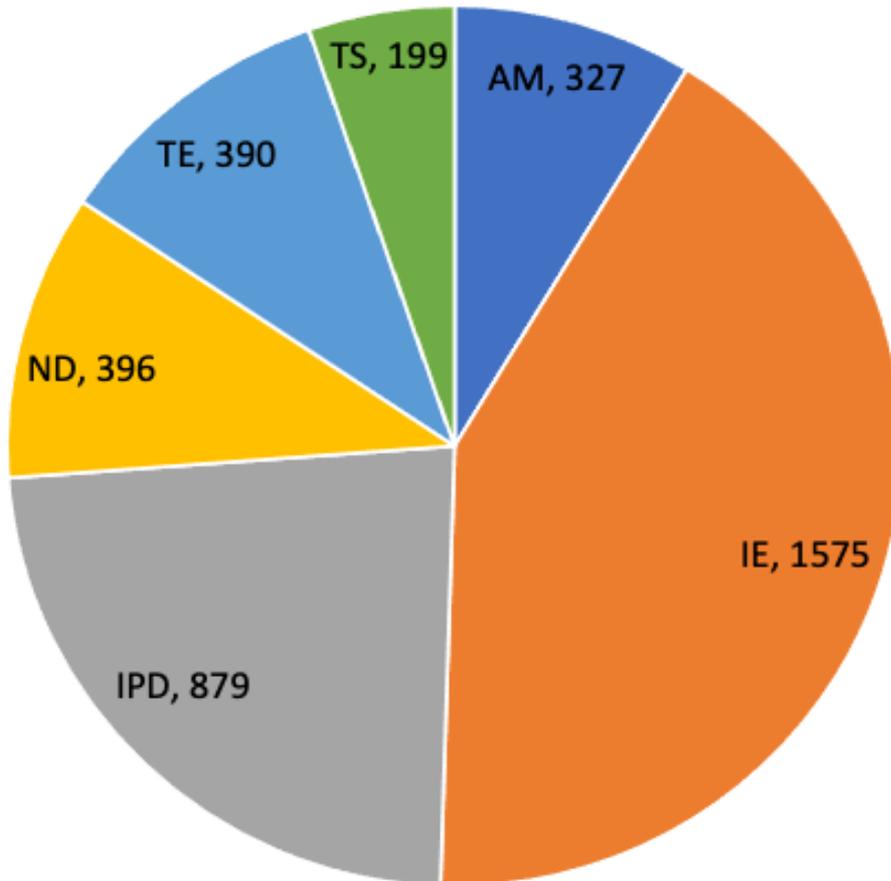
Presented at the  
Nuclear Criticality Safety Program's Technical Program Review  
February 21, 2023

Catherine Percher



# FY22 LLNL Budget Information- \$3.766M

## LLNL Budget by Element, \$K



Element	Carryover
TS	\$48,922
AM	\$190,317
IPD	\$151,559
IE	\$212,668
ND	\$76,734
TE	\$38,730
Total	\$718,931

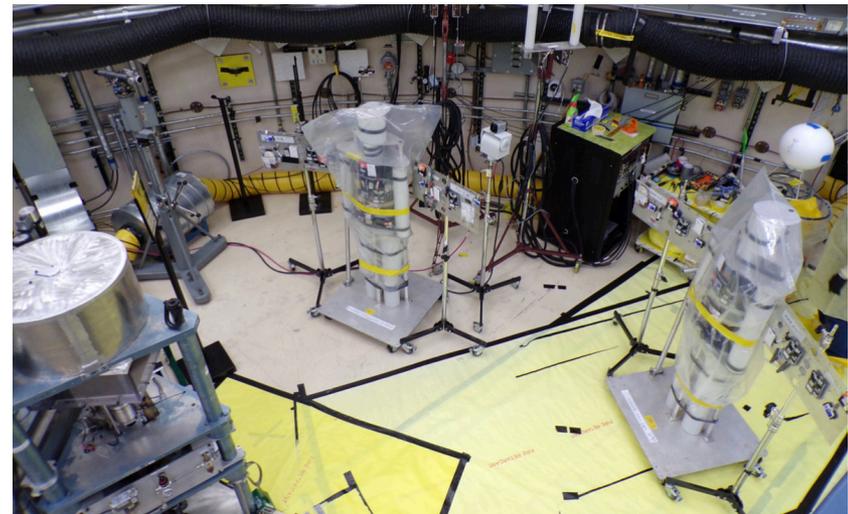
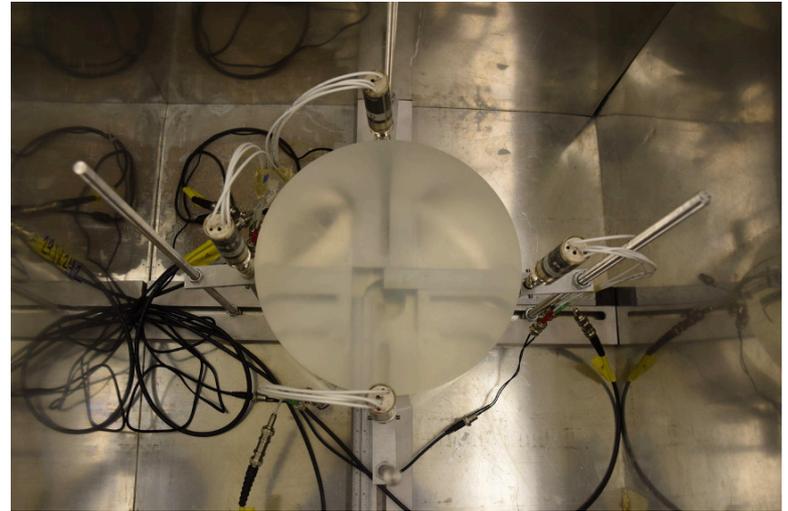
# 2022 Major IE Accomplishments

- Submitted third Thermal-Epithermal eXperiments (TEX) benchmark to ICSBEP (TEX-HEU baselines)- **MIHL Item**
- Completed four TEX-HEU experiments at NCERC incorporating hafnium, high priority for Naval Reactors- **MIHL Item for NNL to deliver Hf**
- Additional TEX Design Variants
  - TEX-HEU with Cl and Li absorbers to address LANL/Y-12 NCS needs- **MIHL Item for Li material production**
  - TEX-Pu with high  $^{240}\text{Pu}$  and additional mixed spectra configurations
  - Low Temperature TEX-HEU, targeting  $-40^{\circ}\text{C}$ - **MIHL Item for surrogate testing**



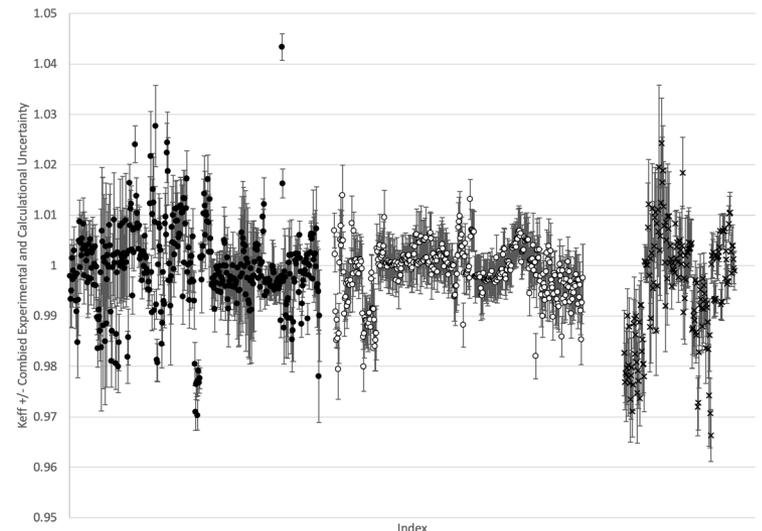
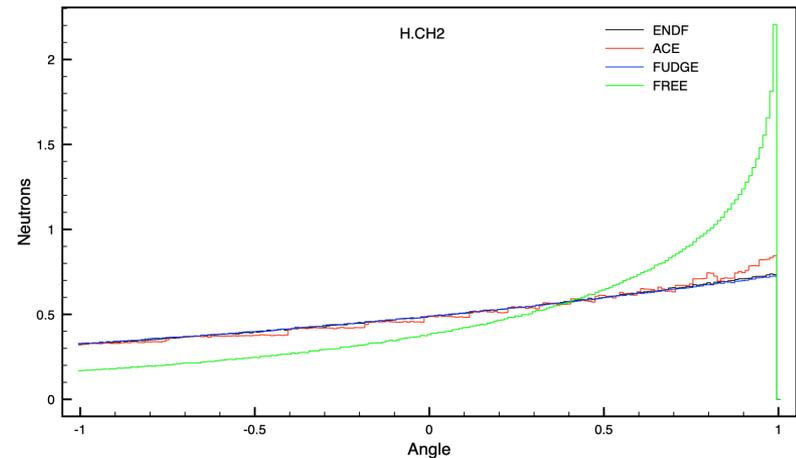
# 2022 Major IE Accomplishments

- Completed final design and completed first experimental campaign at LLNL for Pulsed-Neutron Die-Away (PNDA) experiments
- Hosted 3rd International Nuclear Accident Dosimetry Intercomparison Exercise using Godiva Burst
  - 10 labs (7 DOE, 1 Navy, 2 International)
  - **MIHL Item**
- Completed 2 of 3 High Multiplication Subcritical measurements with SNL (**MIHL Item**)



# 2022 Analytical Methods Accomplishments

- Incorporated unresolved resonance processing to generate ACE-style probability tables in addition to probability density functions with FUDGE, good agreement with other code predictions
- Additional data testing of thermal scattering law data lead to uncovering GNDS specification ambiguity
- Completed additional COG benchmarks for international intercomparison
  - PU: 766 U233: 193 MIX: 356 HEU: 1054  
IEU: 206 LEU: 807 SPEC: 10  $\beta$ -eff: 21



# 2022 Nuclear Data Accomplishments

- Completed scoping study to measure the  $^{233}\text{U}(n,f)/^{235}\text{U}(n,f)$  Cross Section Ratio using the fissionTPC (Time Projection Chamber)
  - Capitalizes on substantial NNSA investment in creating a high-precision measurement methodology used for  $^{239}\text{Pu}$
  - L. Snyder presentation
- LLNL hosted ND2022 in July 2022

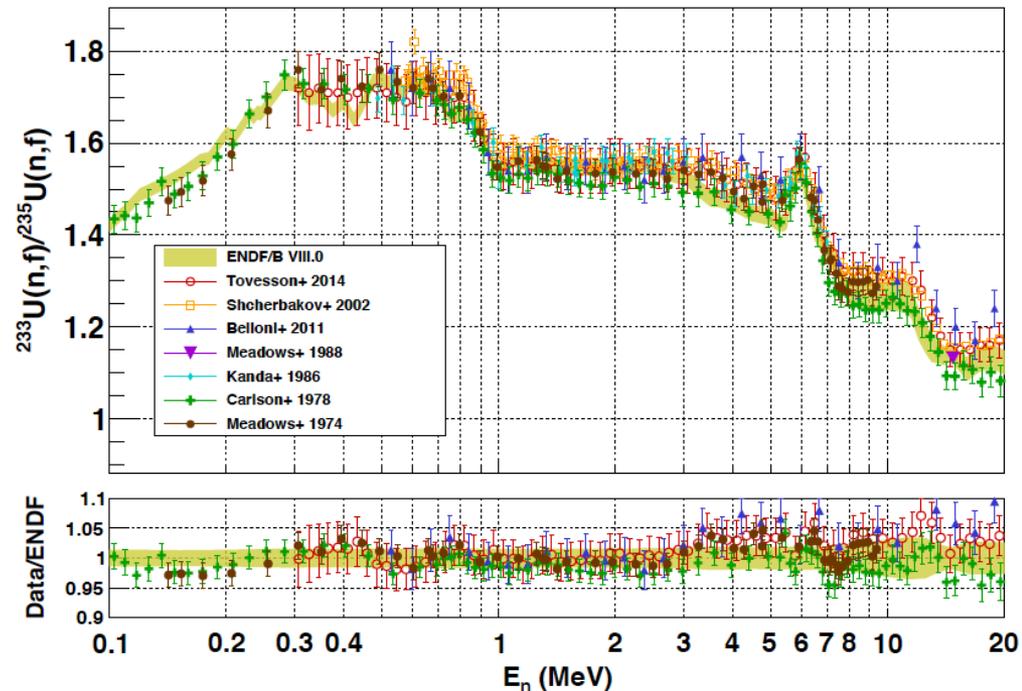
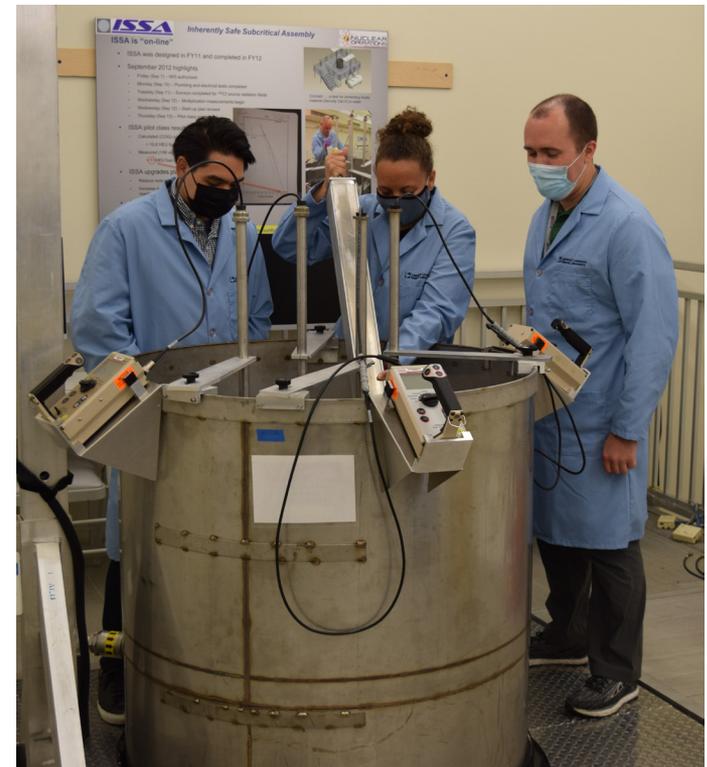


Figure: Measurements overlaid with the ENDF/B-VIII.0 evaluation of  $^{233}\text{U}(n,f)/^{235}\text{U}(n,f)$

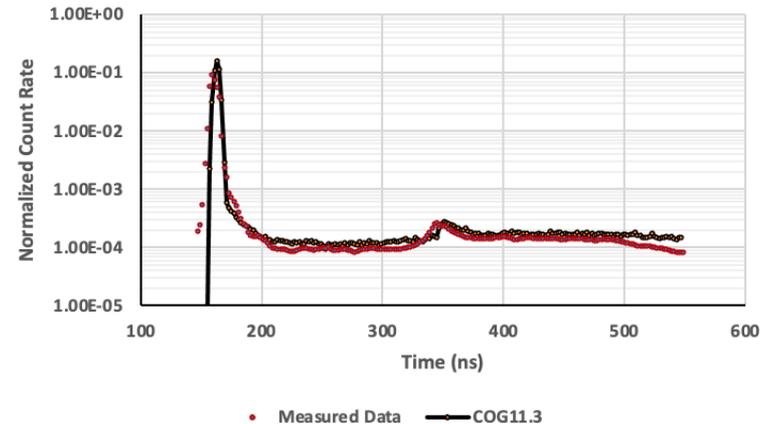
# 2022 Training and Education Accomplishments

- Provided lecture and experimental instruction for 2-week NCSP Hands-on Courses and 1-week Manager's course
- Collaborated with UC Berkeley Nuclear Engineering Department to teach a Nuclear Criticality Safety semester course as part of an NCS pipeline
  - Criticality evaluation term project
  - Hands-on approach to critical experiments using the LLNL Inherently Safe Subcritical Assembly

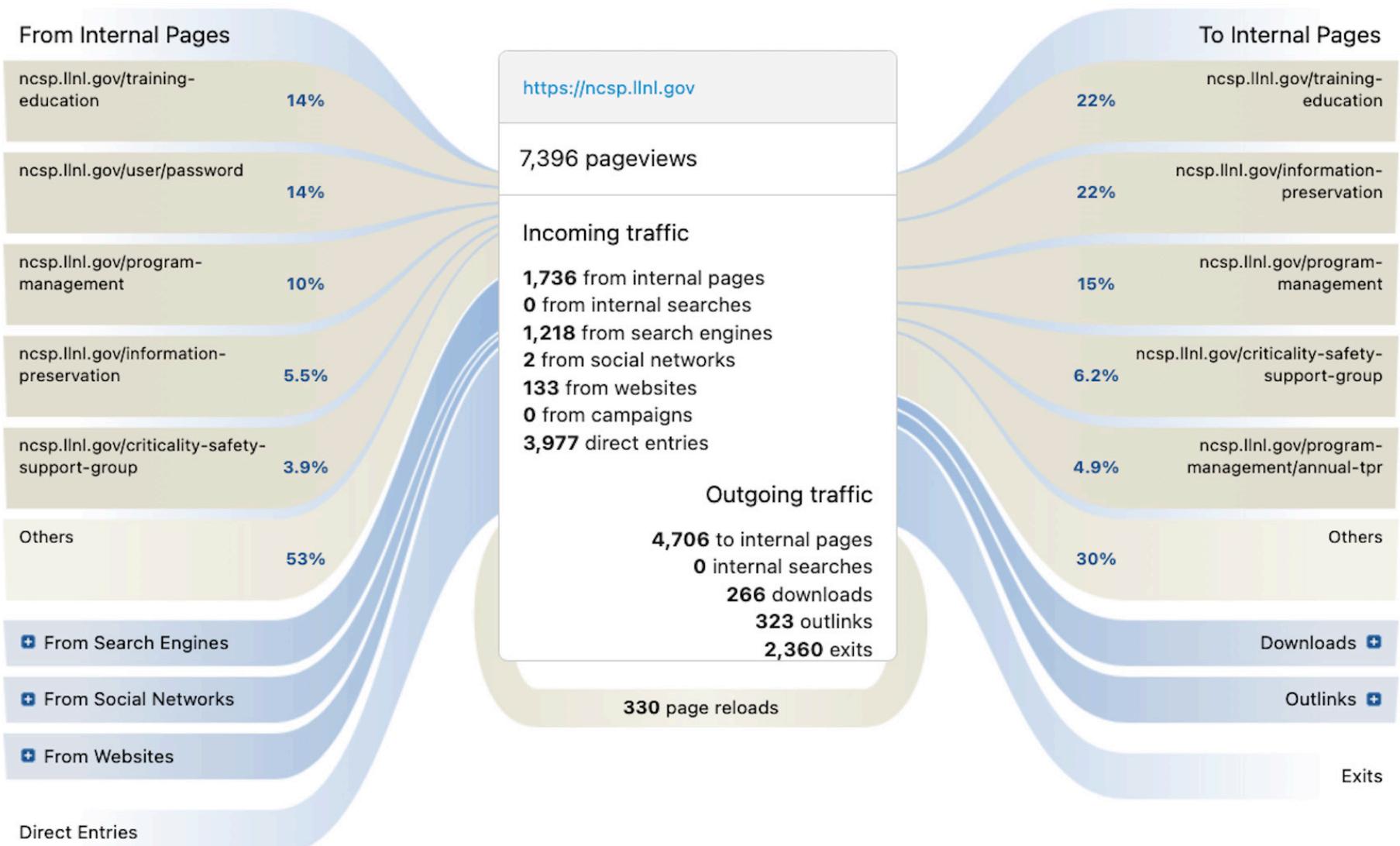


# 2022 IPD Accomplishments

- Maintained NCSP Website, converted NCSP Class registration to Cvent, generated registration pages for meetings (TPR)
- Submitted evaluation for the CH<sub>2</sub> and blank pulsed sphere experiments to SINBAD Technical Review Group
- Supported IT at NNSS, NTS-SLAN, iSRD, and instrument and electronics inspections



# FY22 NCSP Website Statistics- Up 40% Over FY21





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