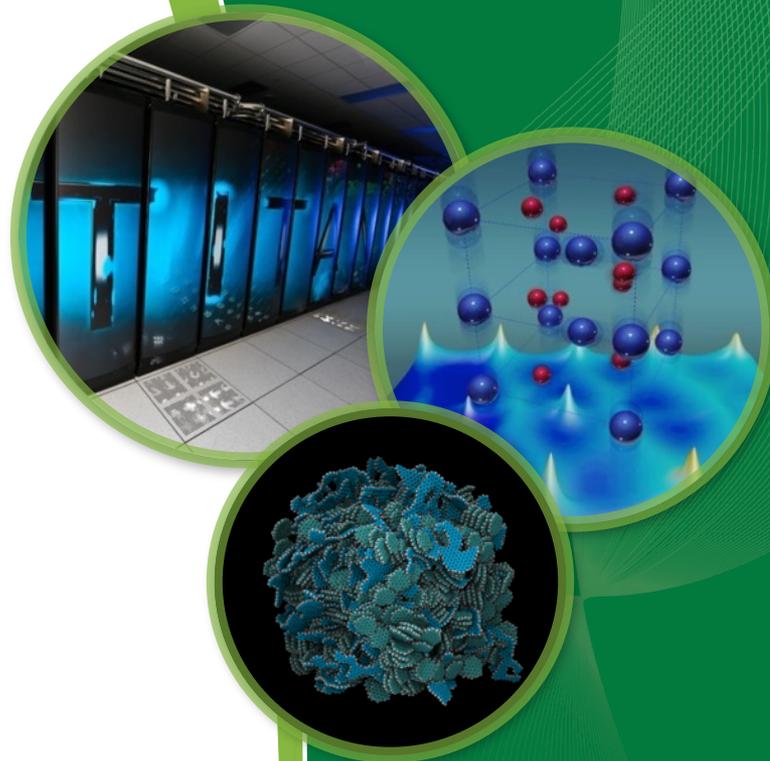


Data Analysis in the FRIB Era

Everyone



ORNL is managed by UT-Battelle
for the US Department of Energy



It's complicated...

- This is the Data Acquisition Working Group
 - what is data analysis doing here?

Survey Summary

- **Merged data streams**, using global time stamping
 - Data from beamline, fragment analysis system
 - Versatility to accept event streams from non-FRIB systems
 - Common event buffer formats?
- **Hundreds to thousands of channels**
- **High data rates**
- **Online analysis a big concern**
 - Flexibility to analyze entire event stream
 - Speed to analyze online
 - Lightweight tools for online analysis
- **Run configuration/state database?** Recorded in event stream
- **Offsite Access to data acquisition and online analysis**

Data Analysis

- **Concerns about data storage and analysis**
 - **Sufficient resources to analyze experimental data** during the measurement to understand the functioning of the experiment online
 - very important for some experiments with
 - High latency event building e.g., Decay Station
 - Complex reconstruction e.g., AT-TPC
 - High priority, high throughput computing is needed for these experiments

Data Analysis

- **Sufficient resources to analyze the merged dataset in the same or less time than was required to make the measurement**
- **Short and long-term storage of data**
 - Experimental event data to be retained for a long enough time on servers at FRIB
 - FRIB datasets will be multi-terabyte in size, driven by flash ADC acquisition and the growing complexity of experiments

Data Analysis

- Access to FRIB data (multi-terabyte)
 - Very high bandwidth connections to the Internet
 - Transfer of data to and from large data centers
 - Home institutions
 - Offsite access
 - Limited network bandwidth to researcher home institutions
 - Processing resources at FRIB will be required to help in data analysis.

To address these topics, we will form a data analysis special interest group

Data Analysis

- Applying “Big Data” methods to nuclear physics data analysis
- Huge amounts of data,
 - GRETA
 - AT-TPC
- Analysis can take a long time with the usual resources available in the community.
- "Workshop on New Methods in Data Analysis"
 - Explore new computing resources and techniques
 - Enabling analyses that look deeper into the data and in shorter processing time

It's complicated...

- This is the Data Acquisition Working Group
 - what is data analysis doing here?
- **If we do not address this, who will?**
- Are there common
 - approaches
 - techniques,
 - technologies?
- Can the FRIB community work together to make analysis work for everyone?