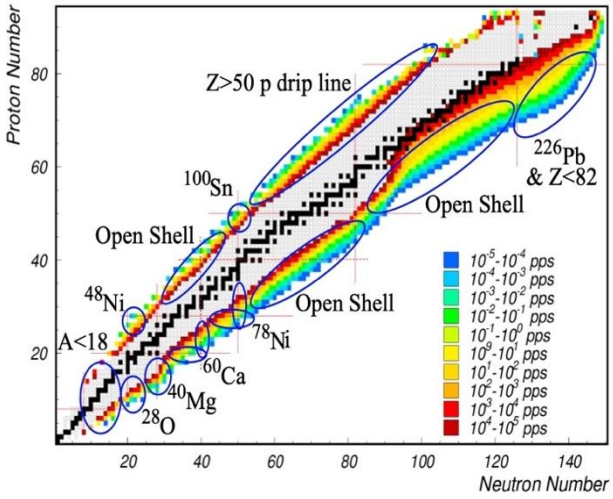
FDSi Day 1 Group Proposals:



Description of the process:
The first year of FRIB operations will offer early opportunities for discovery and precision experiments but it will also be limited in beam time. The limited budgets and time to operation place additional constraints on hardware development and deployment. The FDSi Group and FDS UEC will organize Day 1 Proposal Working Groups focused on various regions to foster collaborations and enable effective FDSi development and use of FRIB beams.

The nature of the FRIB production method requires experiments to be carried out in well-defined regions of the nuclear chart, which in turn impacts the optimal FDSi configuration. Multiple scientific goals can often be addressed through studies of a specific isotope or region. Some specific scientific inquiries can only be addressed by access to data in multiple regions. By coordinating a Group Proposal/s with a two focal point solution of discrete and total absorption / counting spectroscopy, the community can ensure maximum productivity of the FDSi in Year 1 and increase the likelihood of future FDS funding. Because each experiment has the potential to deliver multiple subsets of data for multiple scientific inquiries, coordinated proposals in the first year will also increase the likelihood that each contributing institution secures a dataset for analysis and publication.

The goal for the working groups is to work towards a list of high-profile experiments that can be achieved in the first year of FRIB with a focus on beam rates, required configurations, and primary + secondary physics for each experiment. For the five weeks of September 2020, the groups will meet to discuss the possibilities. The FDSi Group and UEC will organize and communicate over email the meeting times for each working group. After the completion of these efforts, the working groups will come together to discuss the opportunities as a whole, look for physics and hardware configuration overlaps, and more. These discussions will lead to FDSi Group proposals. This process is open to all members of the community and participants can be involved in more than one working group. For further information on the use of the FDSi, please see the FDSi document, https://fds.phy.ornl.gov/FDS-Initiator-v11.pdf .

Working Group Objectives per Region:
Moderator responsibilities-:
Lead the discussion and collect + organize the inputs for proposal development. The questions below may help in generating successful contributions:

- Primary beam/s and targeted isotope/s? How many isotopes can be studied in the same experiment?
- Day One beam rate for targeted isotope and envelope of isotopes?
- What are the primary (and secondary) physics inquiries of the region and does it fit into other regions or a broader scientific context? Is there an obvious leading / overwhelming scientific question for the region that can be easily communicated with broad appeal?
- Is there a connection to the four questions of the FRIB science mission?
- What is the status of competing measurements and methods? Are we competitive or unique?
- What is the optimal FDSi configuration for the measurement/s with an eye towards secondary physics being captured as a byproduct?
- Are the rates sufficient to perform a feasible experiment? Risk versus reward? Validation data? Experiments in Year 1 must deliver!
- Which collaborators are interested in leading the analysis efforts of different slices/subsets of the data? This can go by physics, isotope, or analysis technique.

Three FDSi Proposal Working Groups are based on:

1. Z < 23,
2. 24 < Z < 55,
3. Z > 55,

where each group should cover the strategic regions within these ranges. For Further information, contact Robert Grzywacz (rgrzywac .at. utk.edu) or Ben Crider (bpc135 .at. msstate.edu).

Primary Beam	**Region**	**Physics Opportunities**	**Detector Configurations**
^{18}O	**A<18**	Ab-initio theory benchmarks, neutron-drip line	XSiSi-NEXTi-DEGAi 3HeNi
^{36}Ar**	**N>Z<20**	Ab-initio theory benchmarks, neutron-dripline	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
^{48}Ca*	**^{28}O**	Deformation and islands of inversion	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
	^{40}Mg	Deformation and islands of inversion	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
^{78}Kr	**^{48}Ni**	Exotic pn correlations and 2p-emission	XSiSi/GADGET-DEGAi
	Open Shell 20<N=Z<38	Exotic pn correlations and deformation	XSiSi/GADGET-DEGAi
^{82}Se*	**^{60}Ca**	Weak binding effects and 3N forces	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
	N-rich Open Shell Z=20-28	Deformation, 3N forces, and benchmark of state-of-the-art theory	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
^{86}Kr**	**^{78}Ni**	Portal to the 5th island of inversion? R-process, antineutrino, decay heat	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
^{124}Xe	**^{100}Sn**	Exotic pn correlations and decay modes, superallowed alpha	XSiSi/GADGET-DEGAi, MTAS/SUN
	Open Shell N=Z>36	Exotic pn correlations and deformation	XSiSi/GADGET-DEGAi, MTAS/SUN
^{238}U	**N-rich Open Shell Z>28**	Search for asymmetric shapes and new classifications of collectivity; r-process ; decay heat; antineutrino	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi
	Z>50 p drip line	Mapping the drip-line and xp-emission	XSiSi/GADGET-DEGAi, MTAS/SUN
	^{226}Pb and Z<82	Seniority at the extreme, r-process	XSiSi-NEXTi-DEGAi, MTAS/SUN, 3HeNi

*unique to FRIB, **Guaranteed beams (CD-4)