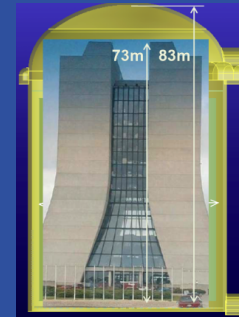
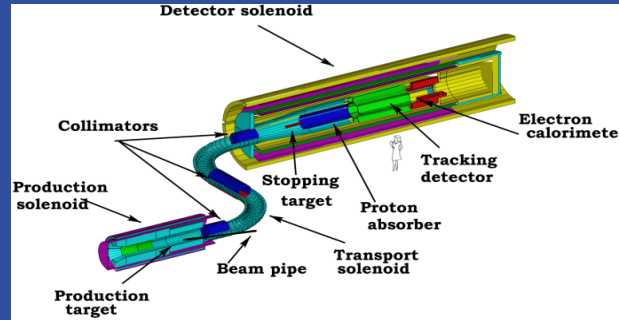
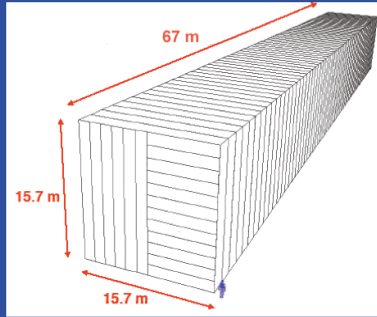
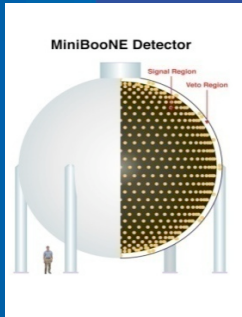


FNAL Program at the Intensity Frontier

Gina Rameika
Presentation to IT Professionals
October 12, 2011





<p>MINOS MiniBooNE MINERvA SeaQuest</p>	<p>NOvA MicroBooNE g-2 MINERvA MINOS</p>	<p>NOvA g-2 LBNE Mu2e</p>	<p>Project X+LBNE m, K, nuclear, ... n Factory ??</p>
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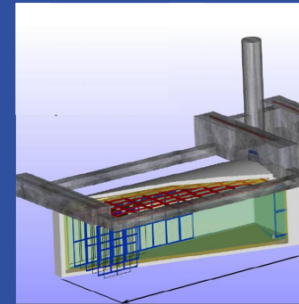
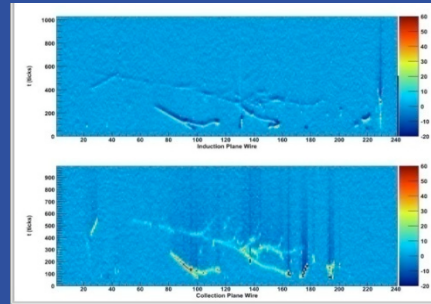
Now

2013

SeaQuest2016

2019

2022



Program this decade

- Operate a series of world-class experiments exploiting the present complex:
 - **MINERvA**: n nuclear cross sections/nuclear structure
 - **MINOS+** : n vs. \bar{n} ; anomalous interactions
 - **NOvA**: n vs. \bar{n} , next step in oscillation parameters
 - **MicroBooNE**: follow **MiniBooNE** anomaly; LAr TPC
 - **SeaQuest**: nuclear physics Drell-Yan process

 - **g-2**: anomalous magnetic moment of the muon
 - **Mu2e**: direct muon to electron conversion

 - **LBNE (700 kW)**: neutrino oscillations, neutrino mass spectrum, matter-antimatter symmetry, proton decay, SN burst

Experiments and Projects at all stages

- Planning new experiments
- Planning and Managing projects
- Developing analysis software
- Collecting data
- Analyzing data

IT needs for Managing projects

- Documentation
 - CDRs, TDRs, Project Management Plans....
 - Web Pages for Reviews (Many Reviews)
 - Document Control Procedures....
- Developing, maintaining and reporting schedules
- Managing budgets ...

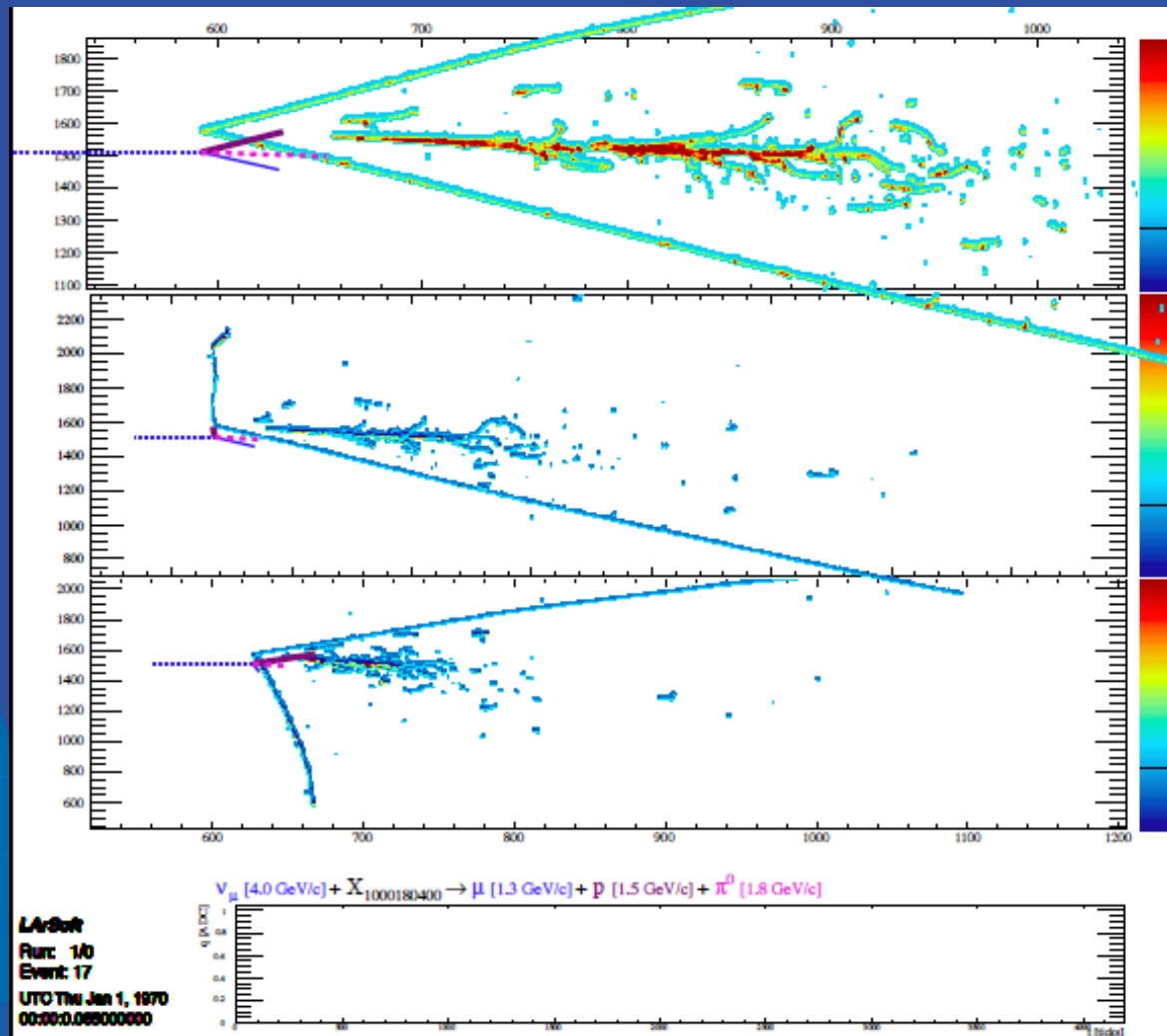
- Different end users
 - Project controls specialists
 - Physicist/Engineer project managers

Many tools available, as may opinions about which ones to use.. Does one size fit all??
Introducing new products requires a lot of overhead that some of the smaller projects can't manage.

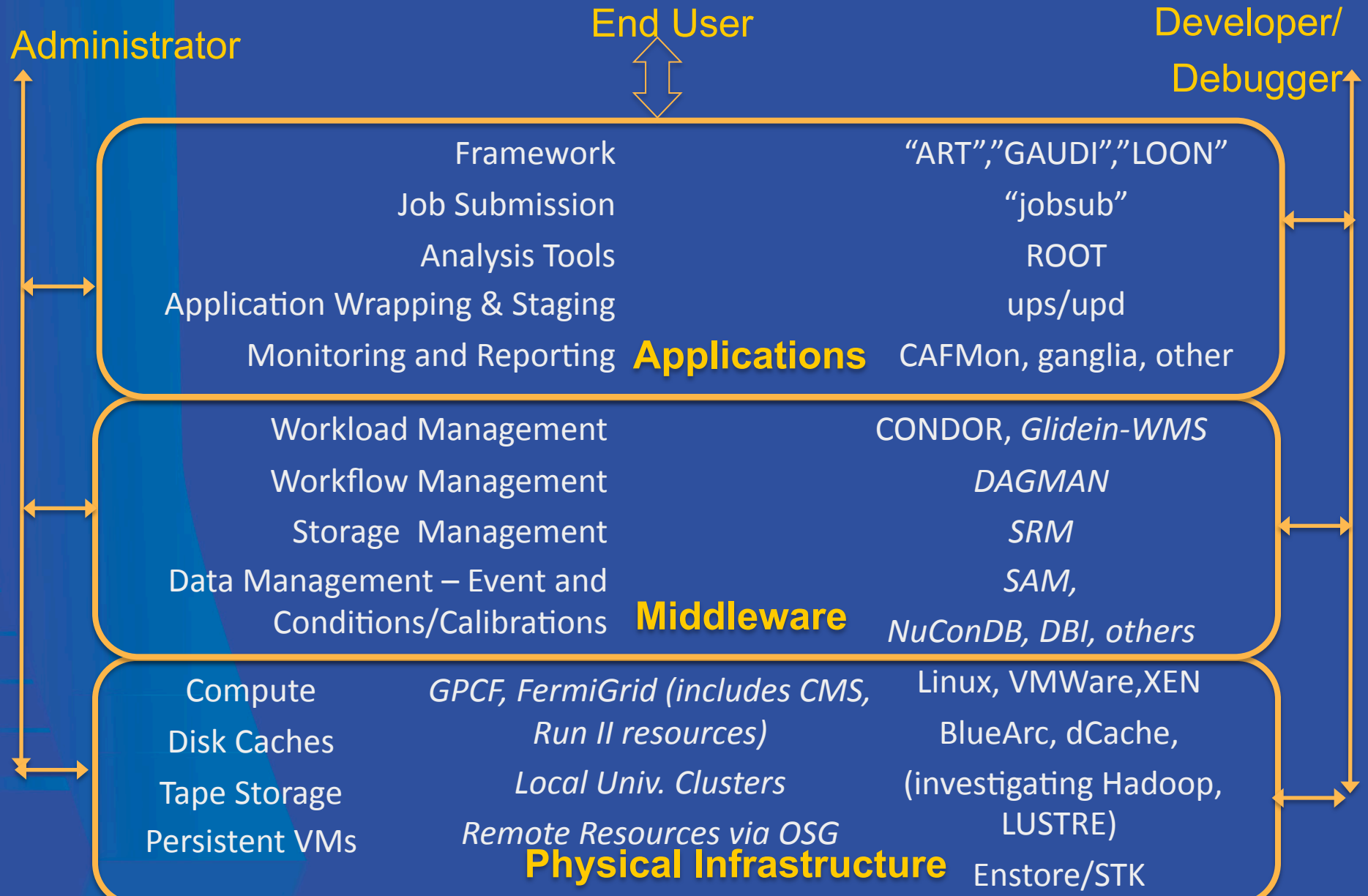
Developing Experiments

- Time Scales from proposal to executions are long
- Many years to get ready
- Detailed, precise simulations are needed to :
 - Develop detector designs
 - Develop reconstruction algorithms
 - Develop analysis procedures
- Simulation programs are very computing intensive
- Experiments need to turn on ready to extract physics

LArSoft for ArgoNeuT, MicroBooNE, LAr1, LBNE ..

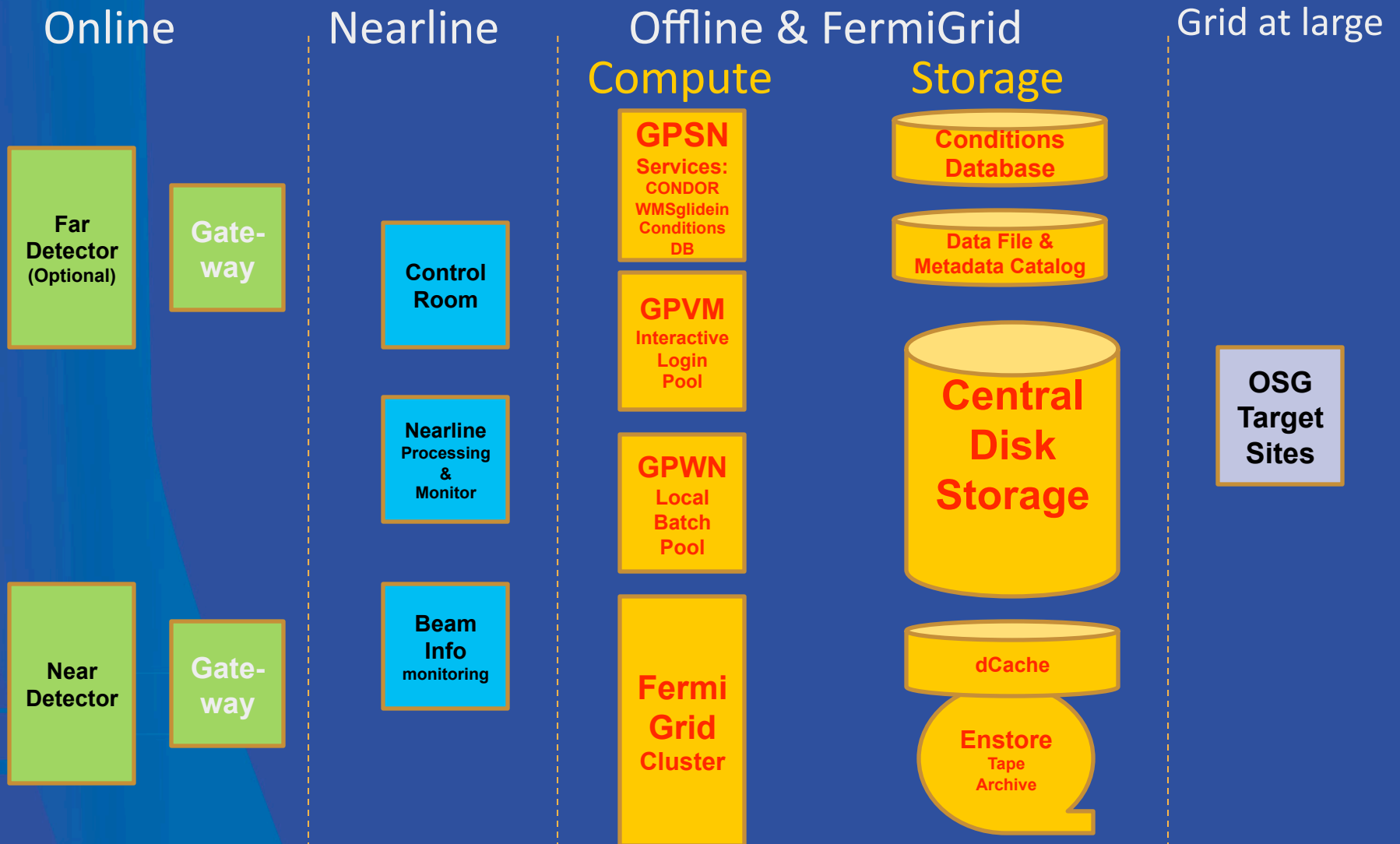


Intensity Frontier Software Architecture

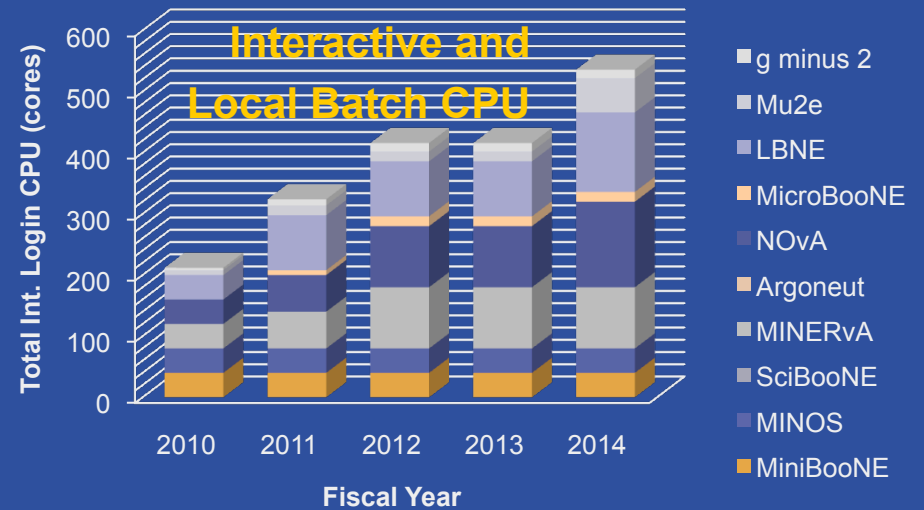
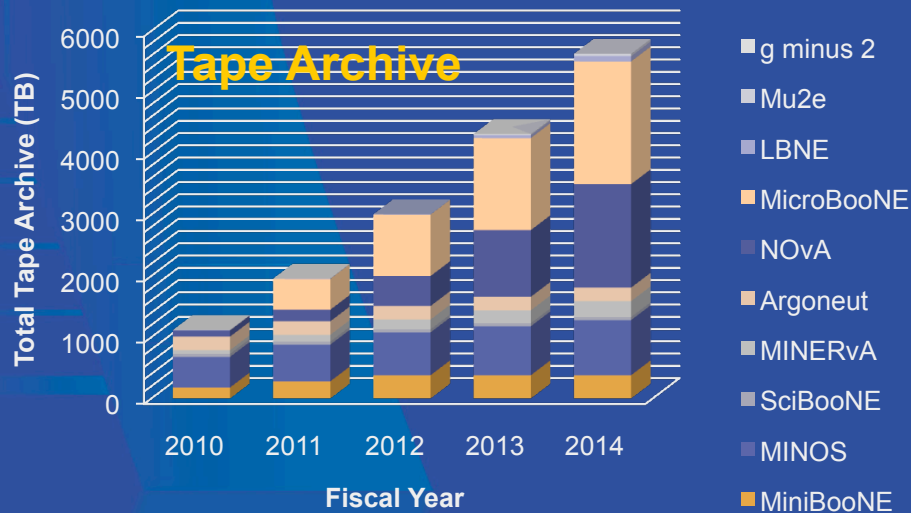
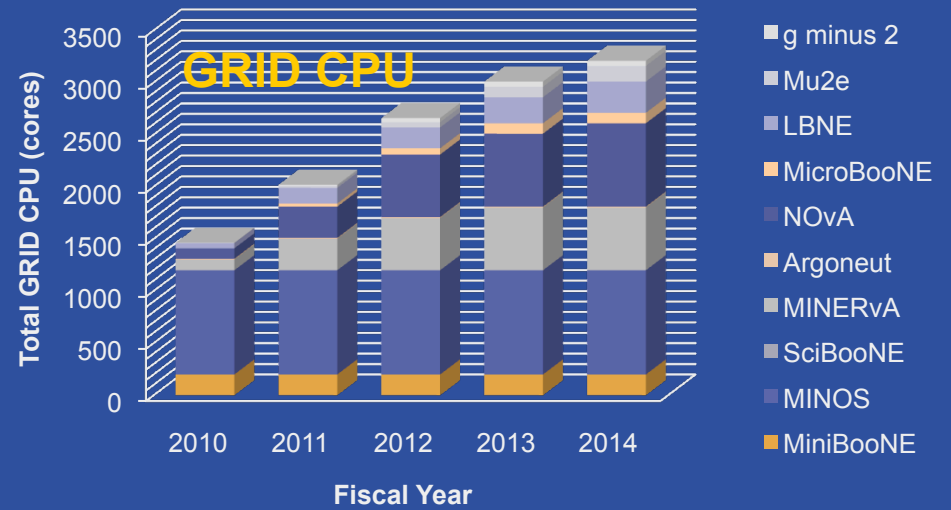
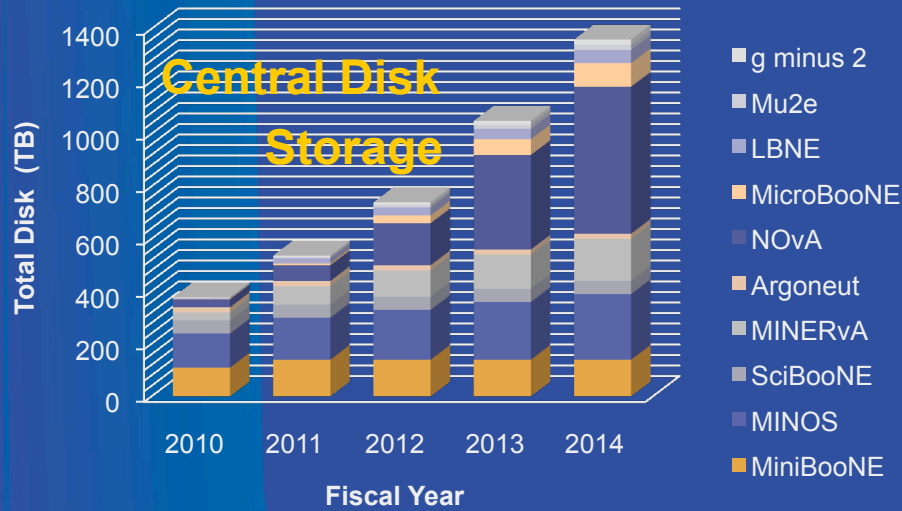


Computing slides courtesy of Lee Lueking

Intensity Frontier Hardware Architecture



Intensity Frontier Computing Resources

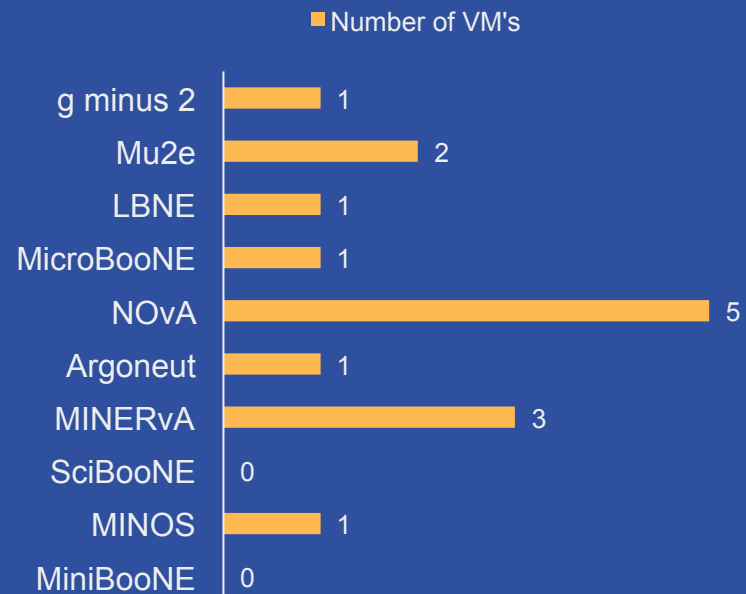


GPCF: General Physics Computing Facility

What is GPCF?

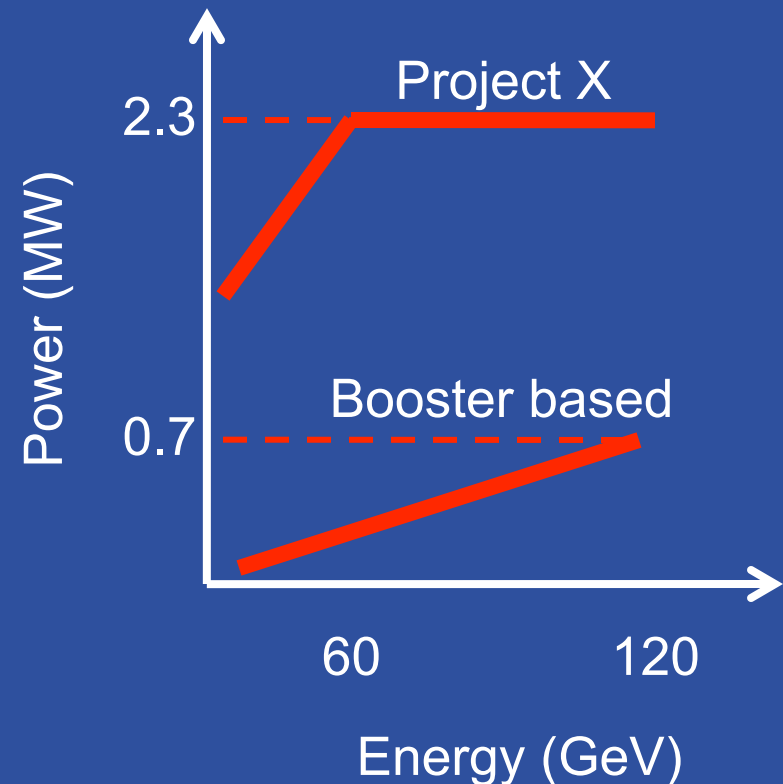
- Interactive login VM's (Virtual Machines) and "Local" Condor Batch slots.
- Each VM comprises 4 computing cores and 4GB memory.
- Central Disk Storage mounted as appropriate for each experiment.
- MINOS and MINERvA have their own dedicated clusters.

GPCF Virtual Machine Assignment

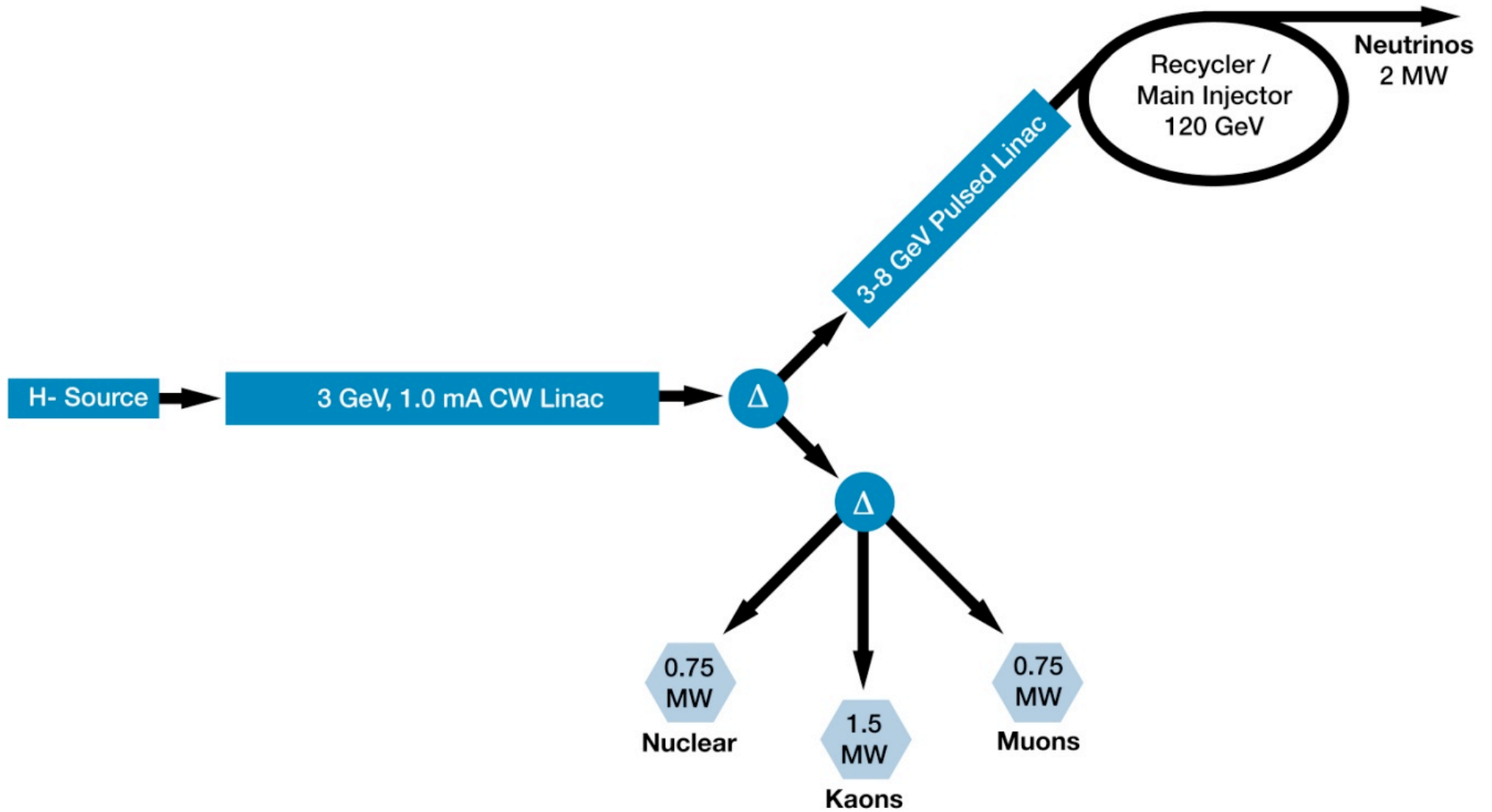


Long Term Neutrino Program

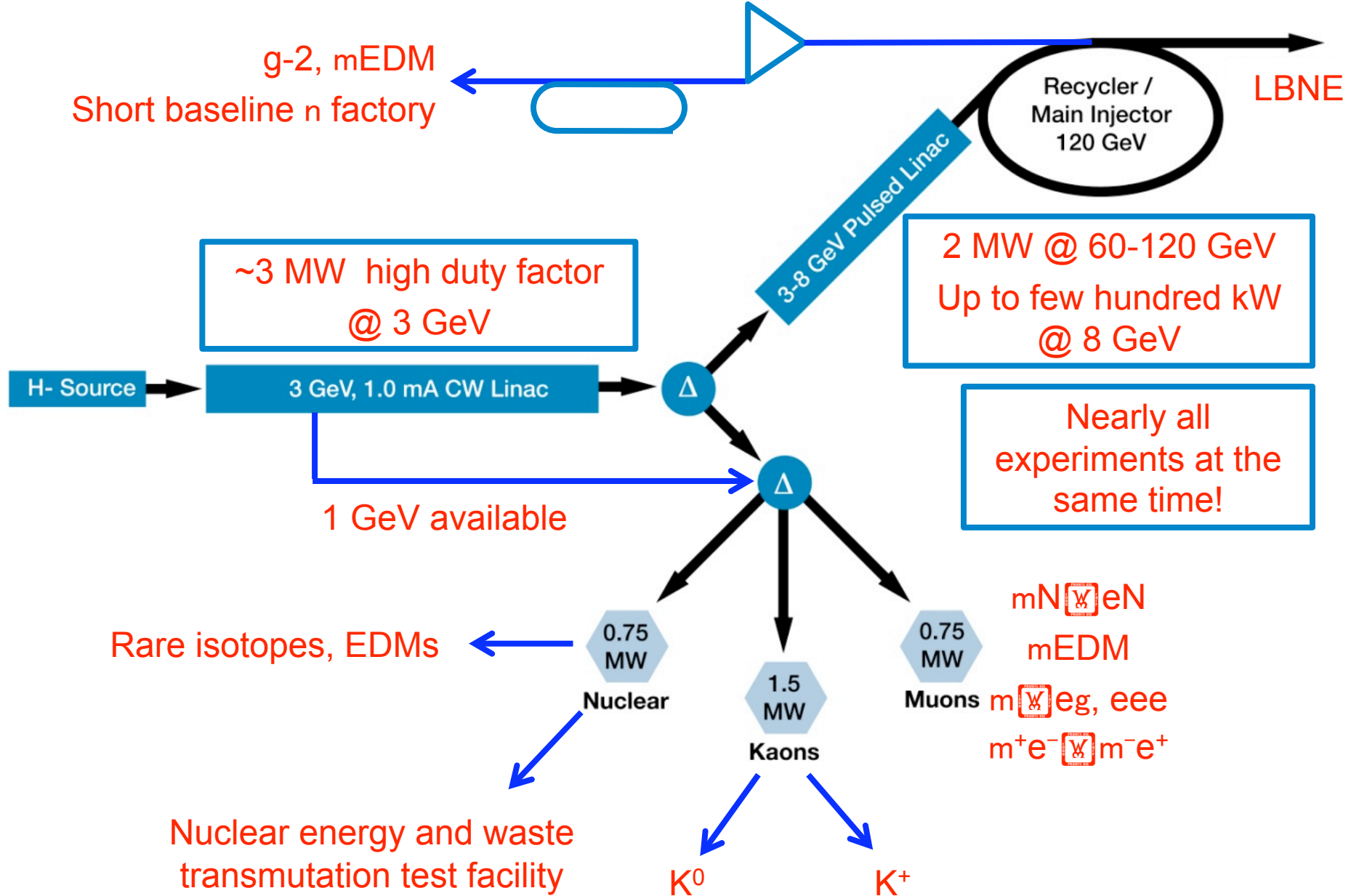
- Goal:
 - Discover new source of CP violation and new flavor symmetries
 - Understand neutrinos to maximize their potential as a tool of science
 - Precision physics through neutrino interferometry
- Tools:
 - Large detectors
 - Well defined initial state
 - variable L/E
- Why Project X:
 - 10 years with Project X
= 30 years without Project X



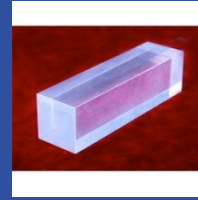
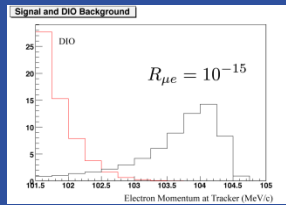
Steve's Project X slide



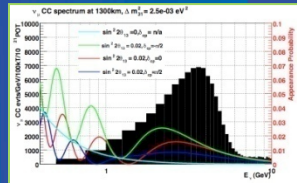
Brendan Casey's Project X slide



Discoveries, precision measurements,
Large # of thesis topics

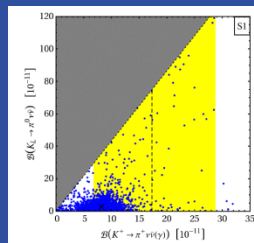
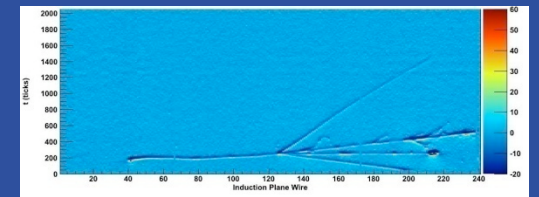


Low mass tracking, ultra precise calorimetry, large area PMTs, LAr...

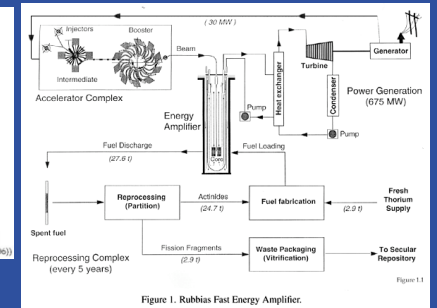
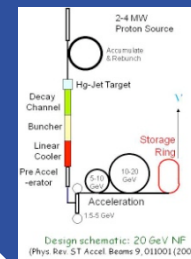
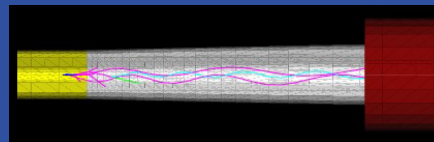
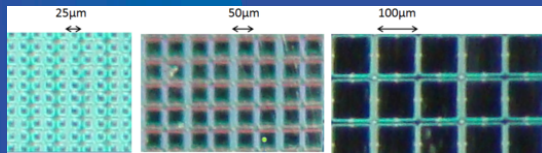


Physics

detectors



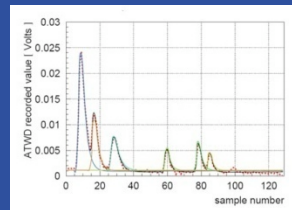
Project X Opportunities



DAQ

accelerators

compact front end,
digitize everything,
store everything...



SCRF, cold m and n ,
 n factories, m colliders,
ADS, transmutation...

