T. Barnes DOE/NP
Program Manager
Medium Energy NP (Acting)
Nuclear Data and
Nuclear Theory Computing
24-26 July 2013
ted.barnes@science.doe.gov

# NP Intro.
# SciDAC-3 PIs Meeting

I. DOE NP Facilities (2 of 3) and NP Office

II. NP SciDAC-3 Projects (facilities relevant!)

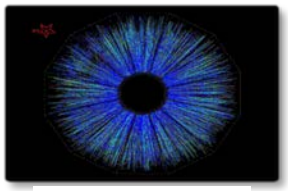
# 1. NP Facilities (2 of 3)

**The Relativistic Heavy Ion Collider (RHIC)** is the only dedicated machine in the world colliding heavy ions at near light speed

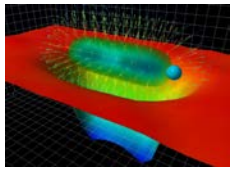
RHIC (BNL)

**The Continuous Electron Beam Accelerator Facility (CEBAF)** is the world's most powerful probe for studying the nucleus of the atom

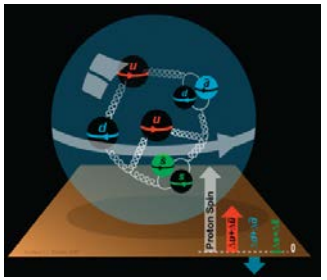
JLAB



**Quark - Gluon Plasma**



**Quark Confinement**



**Structure of Hadrons**

FRIB (MSU) t.b.a.

U.S. DEPARTMENT OF ENERGY
Office of Science

# I. DOE/NP Office Research Div Org Chart)

(Jan. 2013)

## *Office of Nuclear Physics Organization*
## *Physics Research Division*

SciDAC

**Physics Research Division**
**Director (vacant)**

**Christine Izzo, Program Assistant**
- Assistant to Division Director
- Grant Procurements for Division
- Travel Coordinator
- Administrative Support for Division

**Medium Energy Nuclear Physics (~$35M)**
**Ted Barnes, Acting Program Manager**
- Manages ME University/Laboratory research
- Provides guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Prepares/and justifies Budget portfolio
- Conducts science reviews
- Scientific expert in ME nuclear physics

**Heavy Ion Nuclear Physics (~$32M)**
**James Sowinski, Acting Program Manager**
- Manages HI University/Laboratory research
- Provides guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Prepares/justifies HI portion of Budget
- Conducts science reviews
- Scientific expert in HI nuclear physics

**Low Energy Nuclear Physics (~$43M)**
**Cyrus Baktash, Program Manager**
- Manages LE University/Laboratory research
- Provides scientific guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Prepares/justifies LE portion of Budget
- Conducts science reviews
- Scientific expert in LE nuclear physics

**Nuclear Theory (~$32M)**
**George Fai, Program Manager**
- Manages TH University/Laboratory research
- Provides guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Conducts Science Reviews
- Prepares TH portion of Budget
- Scientific expert in nuclear theory
- Conducts science reviews

**Nuclear Data and Nuclear Theory Computing (~$9M)**
**Ted Barnes, Program Manager**
- Manages ND University/Laboratory research
- Provides guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Prepares/justifies ND portion of Budget
- Scientific expert in nuclear data
- Conducts science reviews

**Applications of Nuclear Science & Technology (~$3M)**
**Gulshan Rai, Acting Program Manager**
- Manages ANS&T University/Laboratory research
- Provides guidance for activities in portfolio
- Proposal Reviews/Funding Decisions
- Prepares/justifies ANS&T portion of Budget
- Conducts science reviews
- Scientific expert in nuclear physics

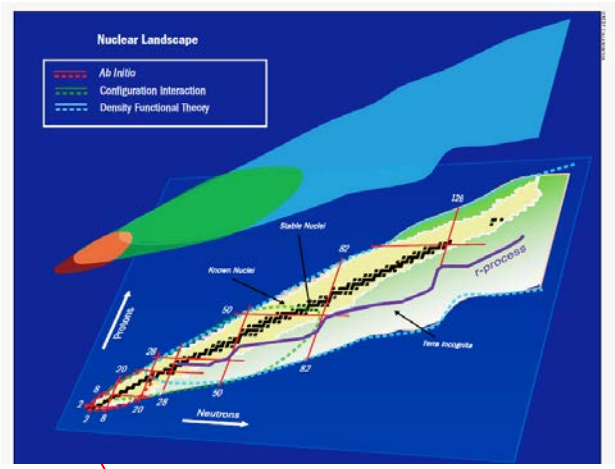
MENP “hadrons”
esp. **JLAB**

HINP “quark-gluon plasma”
esp. **RHIC**@BNL

LENP “nuclei”
esp. **FRIB** (t.b.a.)

# NP SciDAC-3 Projects

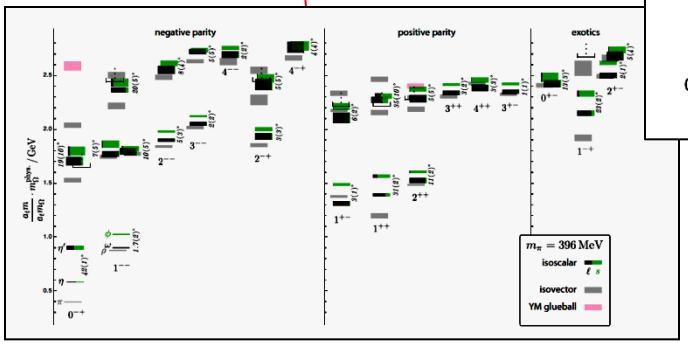
(NP = lead office) **(8/2012 – 8/2017)**

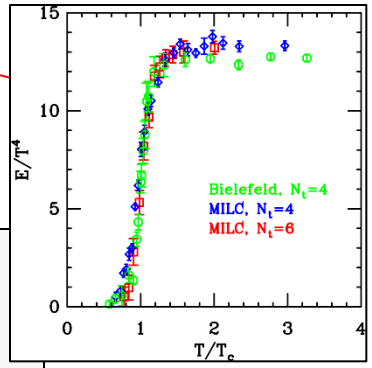



**NUCLEI** **CalLat**

The 3 main areas of NP (4 with FIs added).

**LQCD**




**NUCLEI** (UNEDF') – **LENP** **FRIB**
PD Joe Carlson (LANL)
co-PD sci. Witek Nazarewicz (U.Tenn/ORNL)
co-PD comp. Rusty Lusk (ANL)

**LQCD** (NP) – **HINP, MENP** **RHIC & JLAB**
PD Frithjof Karsch (BNL)
co-PD sci. David Richards (JLAB)
co-PD comp. Richard Brower (BU)

**CalLat** – **LE-ME NP bridge**
**FRIB & JLAB**
PD Wick Haxton (LBNL/UCB)
co-PD sci. Tom Luu (LLNL –> Bonn)
co-PD comp. Esmond Ng (ANL)

5-year multisite comp. NP projects, esp. postdoc and g.s. support.
Tot. 5-year funding $20.5M:
NP $10M, ASCR $7.5M, NNSA $3M.



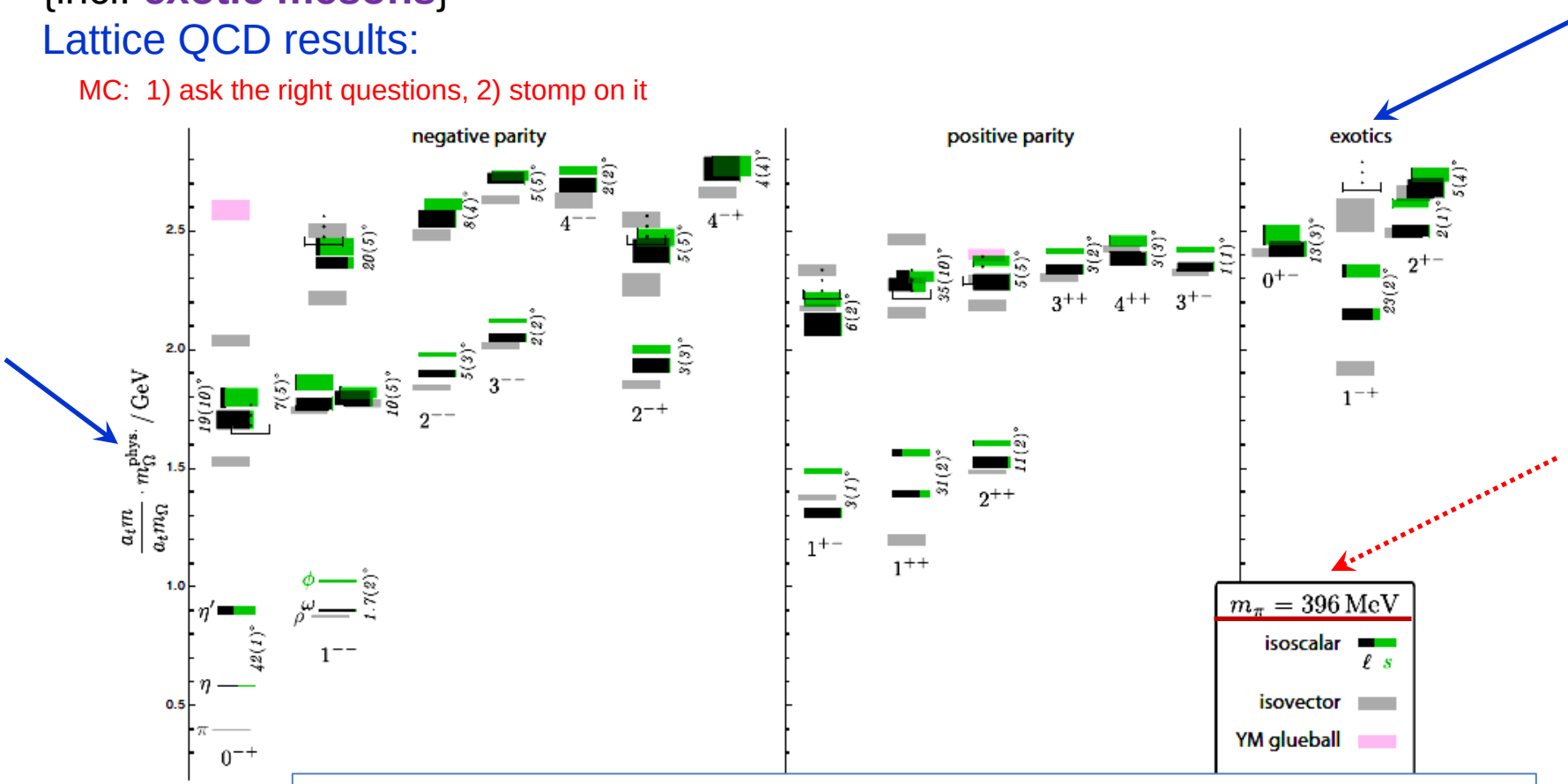
A bit thin on nuclear astrophysics.

MENP from LQCD *e.g.* (JLAB)

What strongly interacting q&qbar&g mesons (q-qbar, q-qbar-g, …) does QCD predict that JLAB experiments will produce after the ~ 0.3G$ 12 GeV upgrade? {incl. **exotic mesons**}

Lattice QCD results:

MC: 1) ask the right questions, 2) stomp on it




**M, q.nos.; just what we need to know for expts! Exciting future: phys $m_{u,d}$, strong decays.**

Spectrum of I=0 light mesons, including exotics, expected to be seen at JLAB (GlueX, 12 GeV upgrade).
J.J.Dudek et al, Phys.Rev. D83 (2011) 111502

END