

FRIB Theory Alliance Summary

2nd China-US-RIB Meeting on Physics of Nuclei and Hadrons

Oct 16 - 18, 2017 Peking University, Beijing, China

Witold Nazarewicz

(for the FRIB-TA Executive Board)



Theory Alliance
FACILITY FOR RARE ISOTOPE BEAMS



U.S. DEPARTMENT OF
ENERGY

Office of
Science

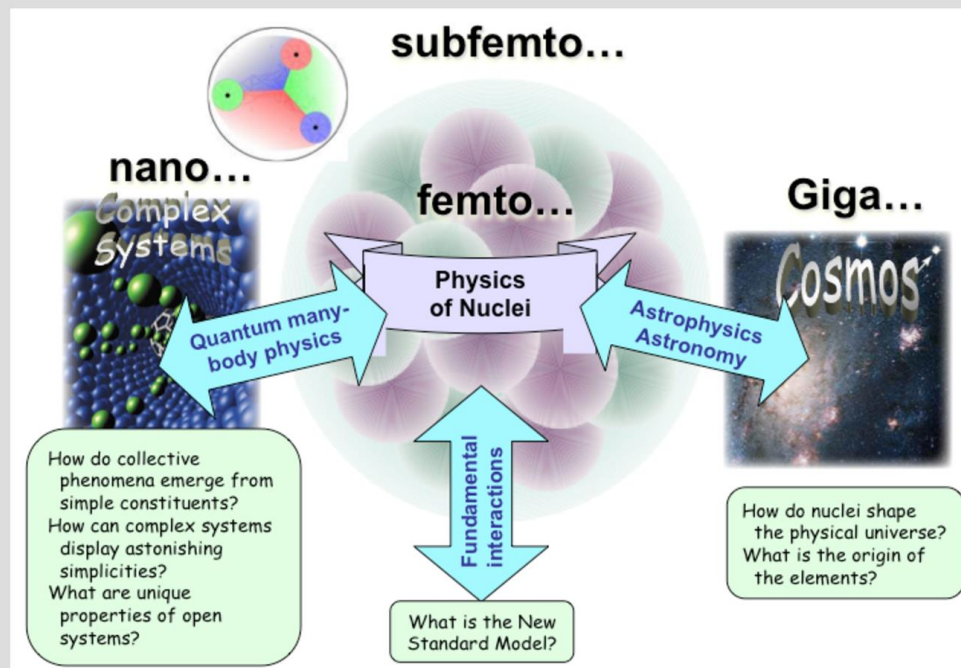


FRIB-TA Website fribtheoryalliance.org



Theory Alliance
FACILITY FOR RARE ISOTOPE BEAMS

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Announcements (see also [Announcement Archive](#))

FRIB-TA Annual Meeting August 2-4, 2017 at LECM

The FRIB-TA Annual Meeting will take place on August 3 and 4 during the Low Energy Community Meeting (LECM) at Argonne National Laboratory. See the [meeting pages](#) for



FRIB-TA Timeline

- FRIB-TA was a part of the LRP 2015 theory initiative
- **First cycle:** June 1st 2015 – May 31st 2017
 - Modest start (supported 2 FRIB theory fellows at 50%)
- FRIB-TA Inaugural meeting: March 31-April 1 2016
- **Second cycle:**
 - Recommended for funding in May 2017
 - Through May 31st 2020



Current FRIB-TA executive board

- Baha Balantekin (University of Wisconsin)
- David Dean (**Director**, Oak Ridge National Laboratory)
- **Charlotte Elster (Ohio University, 2017)**
- George Fuller (University of California San Diego)
- Richard Furnstahl (Ohio State University)
- Charles Horowitz (University of Indiana, 2016)
- Augusto Macchiavelli (Lawrence Berkeley National Lab, 2017)
- **Witek Nazarewicz (Michigan State University)**
- Erich Ormand (Lawrence Livermore National Laboratory)
- **Jorge Piekarewicz (Florida State University, 2017)**
- Rebecca Surman (University of Notre Dame, 2016)
- Michael Thoennessen (Michigan State University)

Filomena Nunes (**Managing Director**, Michigan State University)



FRIB theory fellow program

- Fellow positions serve to retain the best in the field and provide a stepping stone for a permanent position:
 - Not a postdoc – independent research program and travel budget
 - Modeled after INT fellows
- Currently there are 2 fellows (1 at MSU, 1 at a partner institution)
- Renewal builds up to 4 fellows (1 at MSU, 3 at a partner institution)
- Ongoing search for a national fellow
- Long term plan: 6 fellow positions (2 at MSU and 4 nationally)
- Goal is to conduct a fellow search every year

Gregory Potel
(fellow 2016, at MSU)
Expertise in reaction
theory



Diego Lonardoni
(fellow 2015, at LANL)
Expertise in QMC



FRIB theory bridge program

Introduce several faculty/staff positions across the U.S.
(not at MSU)

- 50% compensation (salary/travel) by DOE for a fixed period (5-6 yrs)
- Faculty/staff should spend a significant amount of time at FRIB
- Call for proposals from physics departments and national labs
- FRIB Theory Bridge committee makes the selection of a host
- Host institution runs the search
- Final candidate needs to be vetted by the FRIB-TA board
- The first search at Washington University, St Louis is ongoing



FRIB-TA Broader Impact

FRIB theory activities center on low energy nuclear reactions, nuclear structure and response, and the nature and behavior of dense nuclear matter. These subjects have strong overlap with the FRIB experimental effort, but they also figure prominently in other areas of nuclear physics, particle physics, astrophysics and cosmology, and the “Big Questions”, e.g., the origin of the elements, the origin of neutrino mass, the nature of dark matter . . .

- Gravitational Wave and Multi-Messenger Astronomy
- Neutrinos and Fundamental Symmetries/Particle Physics/Cosmology
- Many body physics/Complex systems/Open quantum systems
- Large scale computations

We should facilitate broader impact in these and other science opportunity areas

- Interdisciplinary meetings (partnering with INT and ECT*)
- Identify a pool of colloquia speakers to spread good news
- ...



FRIB-TA International Links

International collaborations in nuclear theory (**ICNT**) introduced in 2012. Running programs yearly since then. Strong cooperation with INT envisaged.

Europe-US Theory Initiative on the Physics for Exotic Nuclei (**EUSTIPEN**) has been proposed around the ECT* in Trento. The European portion of its funding would come through the European Nuclear Science and Applications Research Program ENSAR2, funded by the European Commission. FRIB-TA would provide travel support, primarily for junior scientists, based in the U.S., to participate in EUSTIPEN activities, relevant for the physics of exotic nuclei. It is anticipated that EUSTIPEN will involve ECT*, ENSAR2, INT, and FRIB-TA.

Two nuclear junior theorists have been selected as the **FRIB-CSC Research Fellows** for 2017. Funding for the Fellows is provided by the China Scholarship Council, with a supplement from the US host institutions. There was a very good interest in the 2017 search. The two fellows will join UTK/ORNL and ISU theory groups. More FRIB-CSC theory fellows are expected to join the FRIB-TA during the next years.



FRIB-TA Education

<http://fribtheoryalliance.org/content/education.php>

The FRIB-TA will work with the community and the TALENT initiative to improve education in nuclear theory.

The FRIB-TA Education Committee is coordinating efforts to produce a survey class exclusively on contemporary research in nuclear physics, targeted at upper-level undergraduates (although also suitable for beginning graduate students). Full-semester survey courses of this type that will serve as pilot versions have been developed recently at Michigan State University (MSU) and Ohio State University (OSU), both using as textbooks the NRC report Nuclear Physics: Exploring the Heart of Matter and the 2015 NSAC Long Range Plan Reaching for the Horizon (with supplementary resources on the basics of nuclear physics).

MSU course website:

<https://people.nscl.msu.edu/~witek/Classes/PHY802/NuclPhys802-2017.html>

OSU course website:

<https://www.physics.ohio-state.edu/~ntg/6805/>



- National FRIB-TA is growing
(infant → toddler)
- Active in several areas
- A well-developed plan in place
- FRIB-TA wants to be a reliable partner
for FRIB and for international nuclear
theory efforts

Nuclear Theory and Science of the Facility for Rare Isotope Beams
Mod. Phys. Lett. A 29, 1430010 (2014)
<https://arxiv.org/pdf/1401.6435.pdf>

