Thank you for joining Laboratory for Nuclear Science!

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LNS Director

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What is LNS?

- "Research home" for all activities in Nuclear and Particle Physics at MIT
- It consists of multiple research groups supported by administrative and computing services groups.
- Overlaps with two academic divisions in the Physics Department:
  - **NUPAX (experimental): focus of today's meeting**
  - NUPAT (theory)
- It hosts the Institute for AI and Fundamental Interactions (IAIFI)
- It operates Bates Research and Engineering Center

Starting research in LNS

- At MIT graduate students start research immediately after arrival
  - Initially slow start: taking courses, exams etc.
  - But always dedicating some % of your time to research: becoming ~100% after ~2-2.5 years
- Experimental research is done within groups led by faculty collaborating with research scientists, postdocs and students
- This year you, the new students, will spend the month of September looking around and then joining a group
- Most students stay with the same group for the duration of their PhD studies but each year there are several students who change groups after a year or two

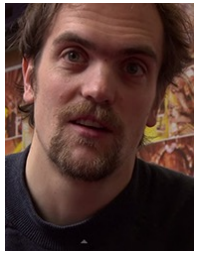
The Thesis

- Most of the education in research is done by “apprenticeship”: working with senior physicist(s)
- The exact topic it usually agreed between you and your research supervisor 1-2 years in advance of thesis defense
- Average start-to-finish duration at MIT is 5.8 years. (summer of 2029)

Resources for your research at MIT

- One of the largest concentrations of particle and nuclear physicists at a US university: wide range of activities
- Research programs at multiple world's finest laboratories: CERN, Fermilab, Brookhaven, Jefferson Lab, Los Alamos, Space Station, X-ray satellite, Gran Sasso, South Pole and many others
- Lab-wide computing support with access to large local resources: "Submit" system
- Bates engineering laboratory north of Boston: building detectors
- Close collaboration with other MIT laboratories: e.g. accelerator R&D at MIT Plasma Lab



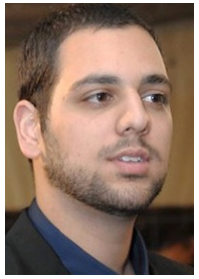






We are 15 (+1) full time faculty in nuclear and particle experimental physics







Experimental research areas and faculty at LNS

- Cosmic rays, Dark Matter with Alpha Magnetic Spectrometer: Ting
- Hadron Structure and Fundamental Interactions, Studies of Few-Nucleon Systems at Jlab, Mainz, Oak Ridge, DESY, CERN, Los Alamos, Brookhaven: Hen, Milner, Williams
- High Energy Physics with CMS at LHC: Harris, Paus
- High Energy Physics with LHCb at LHC: Smith, Williams
- Heavy Ion Physics at LHC and RHIC: Innocenti (1/24), Lee, Roland, Wyslouch
- Neutrinos: Neutrino properties, mass, flavor, Axions, Dark Matter: multiple experiments: Conrad, Formaggio, Winslow
- Exotic nuclei and radioactive molecules: Garcia Ruiz

Choice of the research supervisor/group

- Starting today and until September 29, 2023 you will have various opportunities to get to know all the research groups at LNS:
  - Presentations
  - Formal and informal meetings with the groups
  - Individual conversations with researchers
- By September 30 you will have to email me a prioritized list of your preferences with **at least two group** choices
- I will then talk to you, the relevant faculty and the LNS fiscal office to see what is possible
- Everyone will be assigned shortly after
- Note: in the last ~5 years everyone got their first choice

Choosing the group

- Statements + slides from faculty at this meeting
- During September, various groups may organize welcome meetings, please go and see them
- Send emails yourself, stay proactive, contact professors, students or postdocs

Activities at LNS

- Respond to RSVP for LNS BBQ, September 22 in MIT Sailing Pavilion
- LNS colloquiua: Mondays at 4PM
- Lunch Seminars: Tuedays at 12noon
- Physics Colloquium: Thursdays at 4PM
- Holiday party on December 10th, 2023

Summary

- Welcome to the Laboratory for Nuclear Science
- Please use your September judiciously and carefully to look around and explore the research at the laboratory
- Good luck with your classes
- Feel free to talk to me and our division leader Prof. Formaggio in case of any questions or issues. We are here to help!
- Talk to research groups and research leaders to find out about the wide variety of research taking place at LNS