



subMIT

Getting physics things done at MIT

subMIT Annual Workshop
Summary

2025

Matt Heine



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Getting physics things done at MIT

Project Team Contributions

Workshop on Basic Computing Services in the Physics Department - subMIT

 Thursday Jan 30, 2025, 9:00 AM → 5:00 PM America/New_York

 26-414 (Kolker room)


Project Team Information / Tutorial Sessions

- System Overview
- Resources & How to Access Them
- Software Management
 - Environment / Package managers (Conda)
 - Containers (Docker/Podman, Singularity/Apptainer)
- Batch Jobs

User Talks

Emulating the atomic nucleus

Speaker: Antoine Belley (Massachusetts Institute of Technology)

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Symbolic Learning Nuclear Relations

related to <https://arxiv.org/abs/2404.11477>

Speaker: Jose Miguel Munoz Arias (Massachusetts Institute of Technology)

The needle in a haystack problem of homology-directed DNA repair

related to <https://www.nature.com/articles/s41594-023-01065-w>

Speaker: Henrik Pinholt (Massachusetts Institute of Technology)

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Lattice-QCD 🤝 Software 🤝 Hardware

Speaker: Joshua Lin (student@mit.edu)

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Soft unclustered energy patterns in CMS using dask

Speaker: Pietro Lugato (student@mit.edu)

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Topological Chiral Superconductors beyond Fermi liquid pairing

related to <https://arxiv.org/abs/2409.18067>


Speaker: Luke Kim (Massachusetts Institute of Technology)

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A qubit that corrects itself

related to <https://arxiv.org/abs/2412.03650>

Speaker: Max Geier (Massachusetts Institute of Technology)

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subMIT for cosmological uses

Speaker: Mikhail Ivanov (Massachusetts Institute of Technology)

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Assessing a new analysis with batch jobs

related to <https://arxiv.org/abs/2406.11438>

Speaker: Sumita Ghosh (Massachusetts Institute of Technology)

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Example Workflows & Tools

- Markov Chain Monte Carlo
- Machine Learning
- User-written code / scripts
- Singularity Containers (reproducible, portable environments)
- Dask (automatic parallelization)
- MPI (calculation steps ~ 1 s each, 10^6 steps)
- Slurm batch jobs / job arrays
- Homogenous, simultaneous tasks vs Heterogeneous, few queued (asynchronous) tasks