

Nuclear Masses in Astrophysics for the Next 25 Years

Facility for Rare Isotope Beams, May 2026

Welcome Hotel, Darmstadt, August 2025

Sponsors:



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Lea Wunderlich

Nuclear Masses in Astrophysics for the Next 25 Years

This workshop has the ambitious goal of training and showcasing the next generation of nuclear mass spectrometrists, summarizing the state-of-the-art in nuclear mass measurement and theory, and charting a course for the next 25 years of nuclear masses for nuclear astrophysics.

The nuclear astrophysics community has convened in each decade of the 21st century to discuss the importance of nuclear masses and the path forward. [...] Previous meetings have helped build connections between techniques, continents, and experiment to theory. This workshop will leverage these connections to transform the global network of nuclear masses for nuclear astrophysics and chart the path forward for the next quarter century.



Zach Meisel
Air Force Institute of Technology (USA)

Goal: bring the community together and review state and outlook for our field

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Goal: feature early career researchers

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● ECR participants



Nuclear Masses in Astrophysics for the Next 25 Years

Aug 18 – 22, 2025
Welcome Hotel Darmstadt City
Europe/Berlin timezone

Enter your search term



Overview

Registration

Participant List

Timetable

Contribution List

Event Venue &
Accommodation

Support for Young
Scientists

Code of Conduct

Contact

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Nuclear masses play a central role in nuclear astrophysics, significantly impacting the origin of the elements and observables used to constrain ultradense matter. A variety of techniques are available to meet this need, varying in their emphasis on precision and reach from stability. These are complemented by theory tools that identify key masses and extrapolate beyond experimental reach.

The nuclear astrophysics community has regularly met to discuss the importance of nuclear masses and the path forward for the field, building connections between techniques, research groups across continents, and experiment to theory. In recent years there have been major advances in experiment, nuclear theory, and computational astrophysics. This workshop has the goal of training and showcasing the next generation of nuclear mass spectrometrists, summarizing the state-of-the-art in nuclear mass measurement and theory, and charting a course for the next 25 years of nuclear masses for nuclear astrophysics.

Specific goals of the meeting are to (1) Train and connect the scientists who will be leading nuclear mass measurements for astrophysics over the next decades, (2) Produce a whitepaper charting the course to leverage the complementarity of experimental techniques, while using nuclear and astrophysics theory to guide measurements in order to maximize science output and ultimate reach across the nuclear landscape.

The meeting will be organized as an early career researcher workshop during the first two days, followed by a three-day workshop for all participants. The last days of the meeting is dedicated to kickoff the writing of a whitepaper on “Nuclear Masses in Astrophysics for the Next 25 Years”.

Financial support for travel expenses will be available thanks to the event's sponsorship by [EMMI](#) and [IReNA](#).

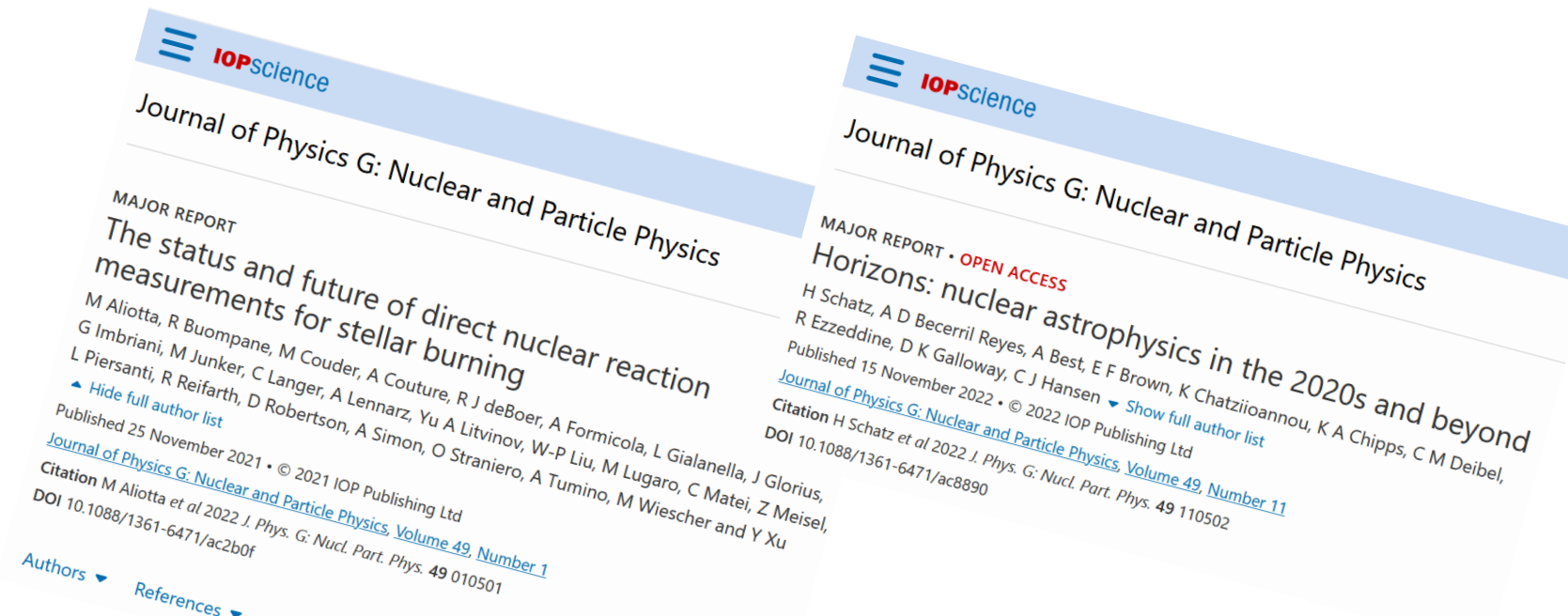
<https://indico.gsi.de/event/22417>



Goal: produce a white paper

This workshop has the ambitious goal of training and showcasing the next generation of nuclear mass spectrometrists, summarizing the state-of-the-art in nuclear mass measurement and theory, and **charting a course for the next 25 years of nuclear masses for nuclear astrophysics.**

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White Paper: Nuclear Masses in Astrophysics for the Next 25 Years

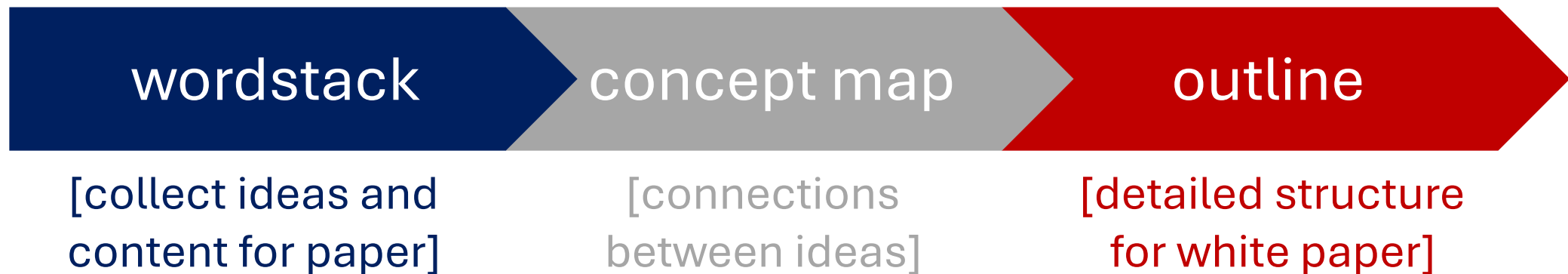
- Concisely describe **important questions** for the next ~25 years
- Briefly review the current status of the field.
- Propose **methods** to solve open questions, and the **connections** between different approaches and sub-fields
- Articulate **needs** to implement those solutions

Goal: produce a white paper

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White paper goals for this workshop



(define writing team | follow-up workshop)

Outline

File t... 📄 📁 📌 ✕

Code Editor Visual Editor

Recompile 📄 ⬇️

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- main.tex
- NuclearData.tex
- writing_guidelines.tex

```
1 \documentclass[10pt]{article}
2 \usepackage{graphicx} % Required for inserting images
3 \usepackage{geometry}
4 \usepackage{xcolor}
5 %\geometry{a4paper, portrait, margin=1in}
6 %\geometry{a4paper, portrait}
7 \geometry{a4paper, portrait,
  textwidth=7in,
  textheight=10.5in}
8
9 \title{Nuclear Masses in Astrophysics for the Next 25 Years}
10 \author{The Writing Team}
11 \date{August 2025}
12
13 \begin{document}
14
15 \maketitle
16 \newpage
17 \tableofcontents
18
19 \Large{\bf Option 1:}
20
21 %\section{The big
```

- File outline
 - Executive Summary
- Nuclear masses and n...
 - Framing the Physics
 - The Chemical Orig...
 - Thermonuclear pr...
 - Compact objects a...
 - Nuclear masses in...
- Nuclear masses and n...
 - The challenge of g...

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Writing Teams (preliminary)

Experiments: Klaus Blaum, Riujiu Chen, Alfredo Estrade, Anu Kankainen, Ania Kwiatkowski, Yuri Litvinov, Jorge Pereira, Sam Porter, Ryan Ringle, Marco Rosenbusch, Guy Savard, Pete Schury, Ragandeep Singh Sidhu, Xing Xu

Astrophysics: Almudena Arcones, Erika Holmbeck, Zach Meisel, Matt Mumpower, Wei Jia Ong, Hendrik Schatz, Nicole Vassh

Theory: Kyle Godbey, Sudhanva Lalit, Mengke Li, Luis González Miret Zaragoza, Martin Nava-Callejas, Nikolai Shchepochin

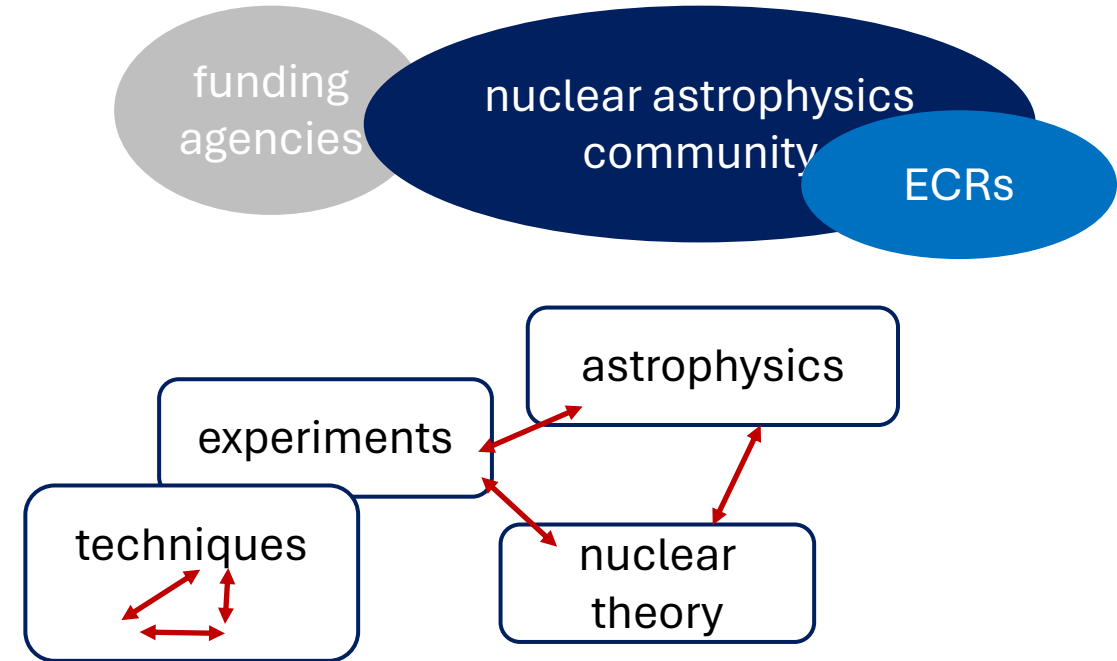
Nuclear Data: F. Kondev, R. Chakma (ANL), W. Huang & M. Wang (IMP), S. Naimi (IJCL)

Goal of the white paper

Begin the production of a whitepaper charting the course to leverage the complementarity of experimental techniques, while using nuclear and astrophysics theory to guide measurements in order to maximize science output and ultimate reach across the nuclear landscape.

The whitepaper will provide a roadmap [...] for future nuclear mass measurements.

• Audience



• Timeline

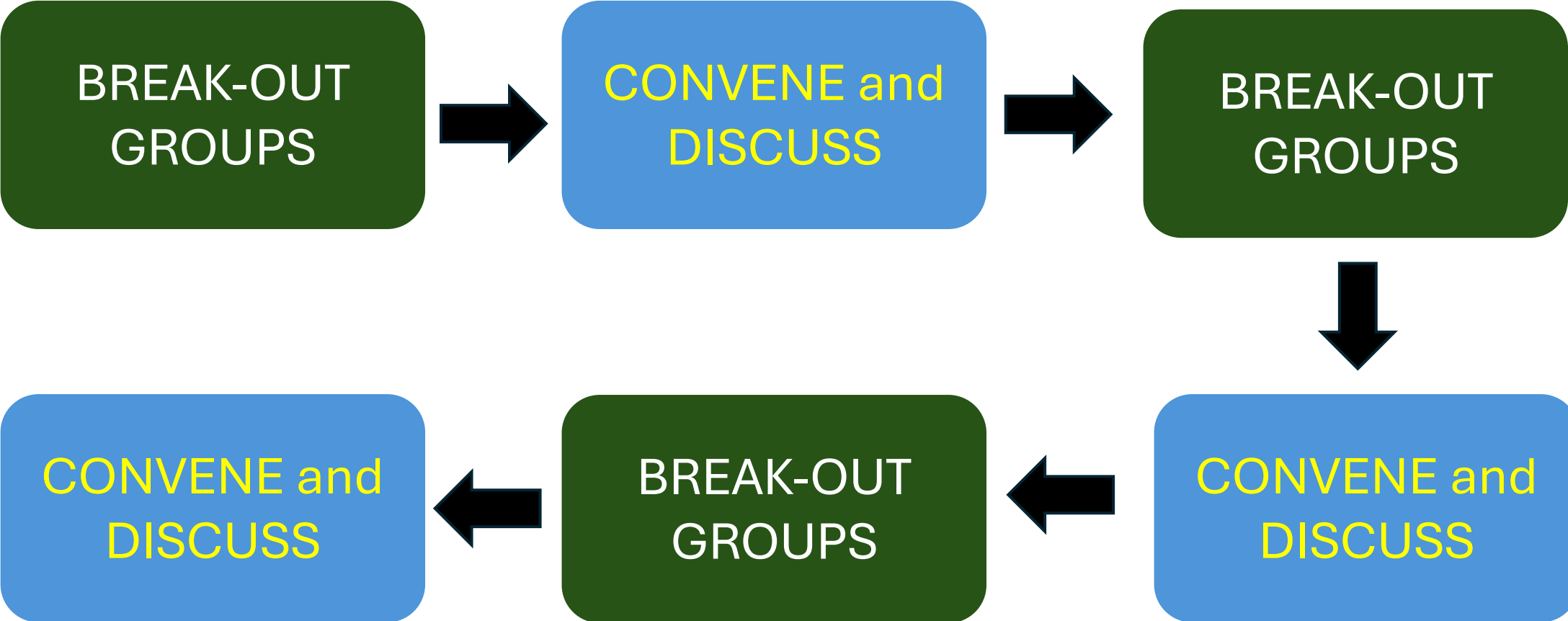
~<1 yr

Follow up workshop in spring or summer 2026 (North America)

Goals for this Nuclear Masses workshop at FRIB

- Revisit goals of the White Paper?
- Detailed outline for each section
 - a bullet point per ~few paragraphs
- Define writing teams and assign tasks
- Create on timeline to finish white paper
- Agree on consistency between sections of white paper
 - Scope and length, overlap of content, etc

Method



Nuclear Masses in Astrophysics for the Next 25 Years

Timetable

Mon 11/05

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09:00	Presentations: Astrophysics	
10:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	09:00 - 10:20
	Coffee break	
	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	10:20 - 10:50
11:00	Presentations: Theory	
12:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	10:50 - 12:20
13:00	Lunch	
	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	12:30 - 14:00
14:00	Presentations: Data	
15:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	14:00 - 15:20
	Coffee break	
	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	15:20 - 15:50
16:00	Break-out group discussion	
17:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	15:50 - 17:20

Tue 12/05

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09:00	Presentations: Experiments	
10:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	09:00 - 10:20
	Coffee break	
	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	10:20 - 10:50
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Wed 13/05

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09:00	Break-out group discussion	
10:00	1221 A/B, Facility for Rare Isotope Beams, East Lansing, MI, USA	09:00 - 10:20
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<https://indico.global/event/17142>