

STATUS REPORT ON NUCLEAR STRUCTURE AND DECAY DATA ACTIVITIES AT OAK RIDGE NATIONAL LABORATORY

25th Technical Meeting of the
Nuclear Structure and Decay Data
(NSDD) Network

Caroline Nesaraja, Michael Smith

Members:

- Michael Smith: PI Nuclear Data Program – Nuclear astrophysics experiment and data
- Caroline Nesaraja: Research Staff - ENSDF evaluator
- Larry Zhang : Student - nuclear astrophysics data

Activities:

- Nuclear Structure Data (ENSDF)
- Nuclear Astrophysics Data



Nuclear Structure Data:

Mass Chain Evaluation

ORNL responsibility: A=241-249, A=69



Nuclear Structure and Nuclear Astrophysics Group
Nuclear Data Group

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Mass Chain Current ENSDF Database (from NNDC website)

241	C.D. Nesaraja. NDS 130, 183 (2015)	(Lit cut-off Sept. 2015)
242	M.J. Martin & C.D. Nesaraja. NDS 186, 263 (2002)	(Lit cut-off Dec. 2021)
243	C.D. Nesaraja & E.A. McCutchan. NDS 121, 695 (2014)	(Lit cut-off Sept. 2013)
244	C.D. Nesaraja. NDS 146, 387 (2017)	(Lit cut-off Aug. 2017)
245	C.D. Nesaraja. NDS 189, 1 (2023)	(Lit. cut-off Feb. 2023)
246	C.D. Nesaraja (post review edits submitted to NNDC)	(Lit. cut-off Jul. 2022)
247	C.D. Nesaraja. NDS 125, 395 (2015)	(Lit. cut-off Mar. 2014)
248	M.J. Martin. NDS 122, 377 (2014)	(Lit. cut-off Sept. 2014)
249	C.D. Nesaraja. (to be published)	(Lit. cut-off Oct. 2023)
69	C.D. Nesaraja. (submitted to NNDC)	(Lit. cut-off Apr. 2023)

Other Activities related to Nuclear Data

Nuclear Science Advisory- Nuclear Data Subcommittee was formed in 2022

to assess challenges, opportunities, and priorities for effective stewardship of nuclear data.

First Report of the Nuclear Data Charge Subcommittee of the Nuclear Science Advisory Committee

September 19, 2022

Subcommittee Chair: Lee Bernstein (UC-Berkeley/LBNL)

Subcommittee Members:

Friederike Bostelmann (ORNL), Mike Carpenter (ANL), Mark Chadwick (LANL),
Max Fratoni (UC Berkeley), Ayman Hawari (NC State), Lawrence Heilbronn (UT-Knoxville),
Calvin Howell (Duke), Jo Ressler (LLNL), Cynthia Keppel (Jefferson Lab),
Arjan Koning (IAEA), Ken LaBel & Tom Turflinger (NASA & Aerospace),
Caroline Nesaraja (ORNL), Syed Qaim (FZJ), Catherine Romano (Aerospace),
Artemis Spyrou (MSU), Sunniva Siem (Univ. of Oslo), Cristiaan Vermeulen (LANL),
Ramona Vogt (LLNL/UC Davis)

Second Report of the Nuclear Data Charge Subcommittee of the Nuclear Science Advisory Committee

February 4, 2023

Subcommittee Chair: Lee Bernstein (UC-Berkeley/LBNL)

Subcommittee Members:

Friederike Bostelmann (ORNL), Mike Carpenter (ANL), Mark Chadwick (LANL),
Max Fratoni (UC Berkeley), Ayman Hawari (NC State), Lawrence Heilbronn (UT-Knoxville),
Calvin Howell (Duke), Jo Ressler (LLNL), Cynthia Keppel (Jefferson Lab),
Arjan Koning (IAEA), Ken LaBel & Tom Turflinger (NASA & Aerospace),
Caroline Nesaraja (ORNL), Syed Qaim (FZJ), Catherine Romano (Aerospace),
Artemis Spyrou (MSU), Sunniva Siem (Univ. of Oslo), Cristiaan Vermeulen (LANL),
Ramona Vogt (LLNL/UC Davis)

Nuclear Astrophysics Data:

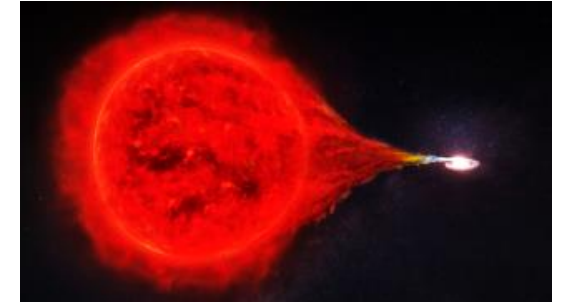
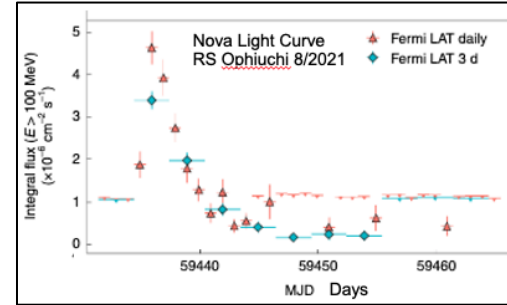
Assessing uncertainties of reactions critical for nucleosynthesis in Stellar Explosions

Thermonuclear Reaction Rate Uncertainties

- new thermonuclear reaction rate uncertainties are currently being tested in an uncertainty quantification (UQ) analysis of nova nucleosynthesis

Nuclear Astrophysics Data Needs Summarized

- two review articles published with over 330 references



Nova RS Ophiuchi erupted in 8/2021

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REVIEW article
Front. Astron. Space Sci., 10 November 2023
Sec. Nuclear Physics
Volume 10 - 2023 |
<https://doi.org/10.3389/fspas.2023.1243615>

This article is part of the Research Topic
Cross Section Data of Interest for Nuclear Astrophysics:
Experimental and Theoretical Status, and Perspectives
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Nuclear data resources and initiatives for nuclear astrophysics

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Research into the cosmic synthesis of the elements, the evolution and explosion of stars, the nature of the early Universe, and other important topics in nuclear astrophysics are at the forefront of nuclear science. These studies are motivating

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REVIEW article
Front. Astron. Space Sci., 08 September 2023
Sec. Space Physics
Volume 10 - 2023 |
<https://doi.org/10.3389/fspas.2023.1228901>

This article is part of the Research Topic
Editor's Challenge in Space Physics: Solved and Unsolved Problems in Space Physics
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Nuclear data for space exploration

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Understanding the harmful effects of galactic cosmic rays (GCRs) on space exploration requires a substantial amount of nuclear data. Specifically, the interaction of energetic GCR charged particles with spacecraft materials