

JINA: View From The Southwest

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View from the Southwest



Over the past 3 years JINA has been a catalyst for

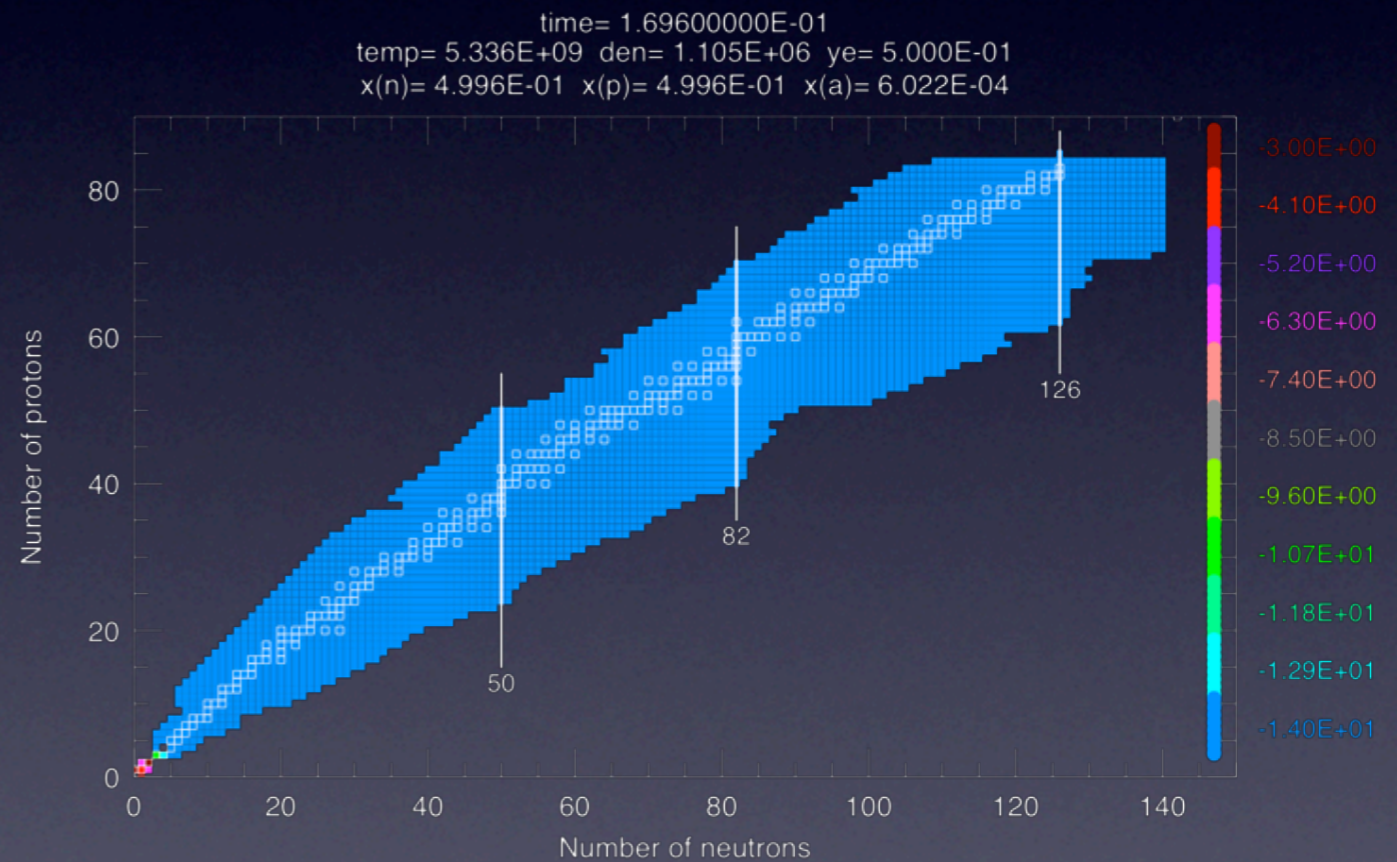
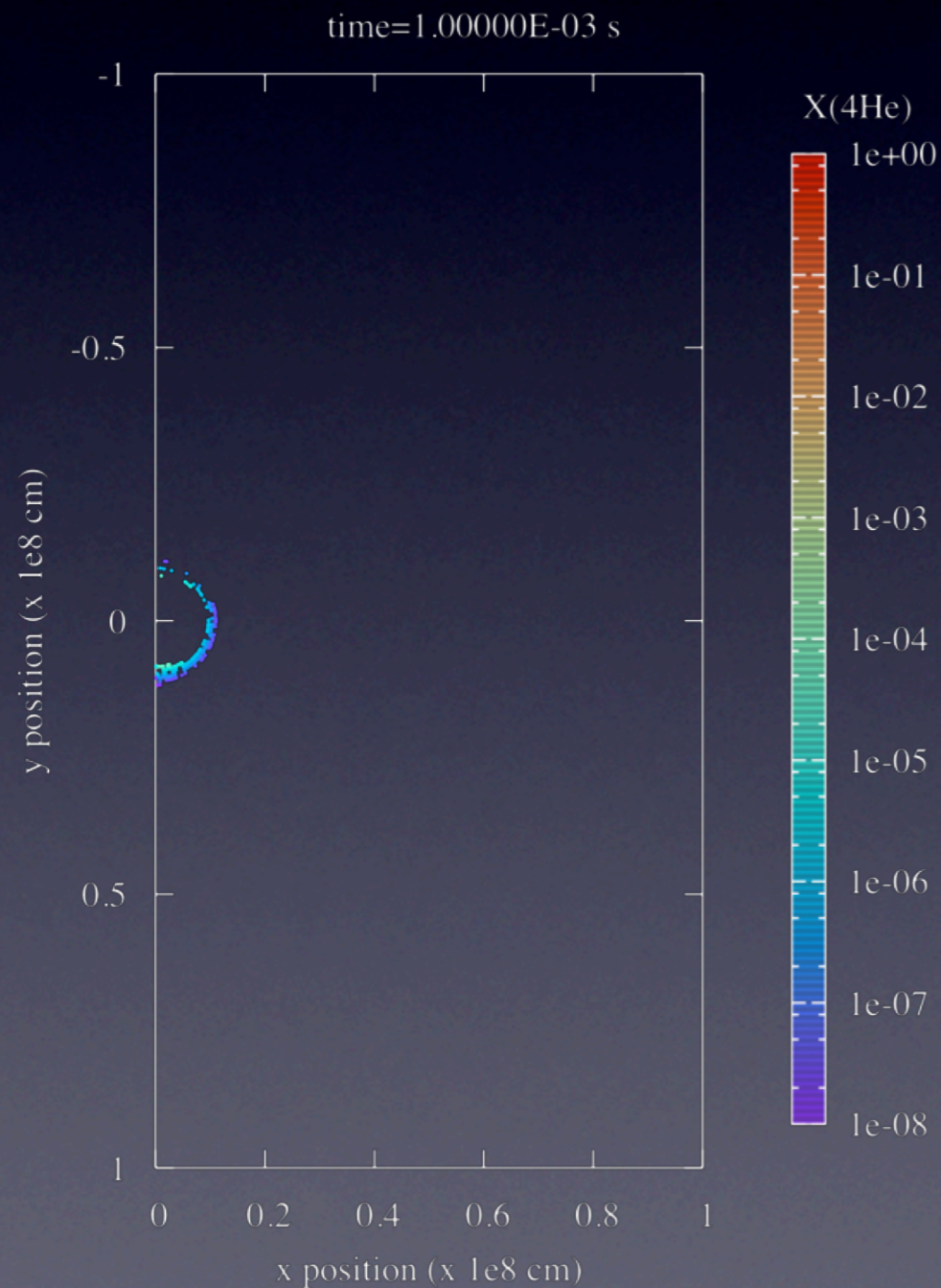
- advancing scientific achievements and technical capability
- developing the workforce
- expanding collaborations
- initiating new funding opportunities

in nuclear astrophysics at the University of Arizona and within the Applied Physics Division, Theoretical Division, Computer and Computation Sciences Division, and the Neutron Science Center at Los Alamos.



JINA is instrumental in boosting scientific progress.

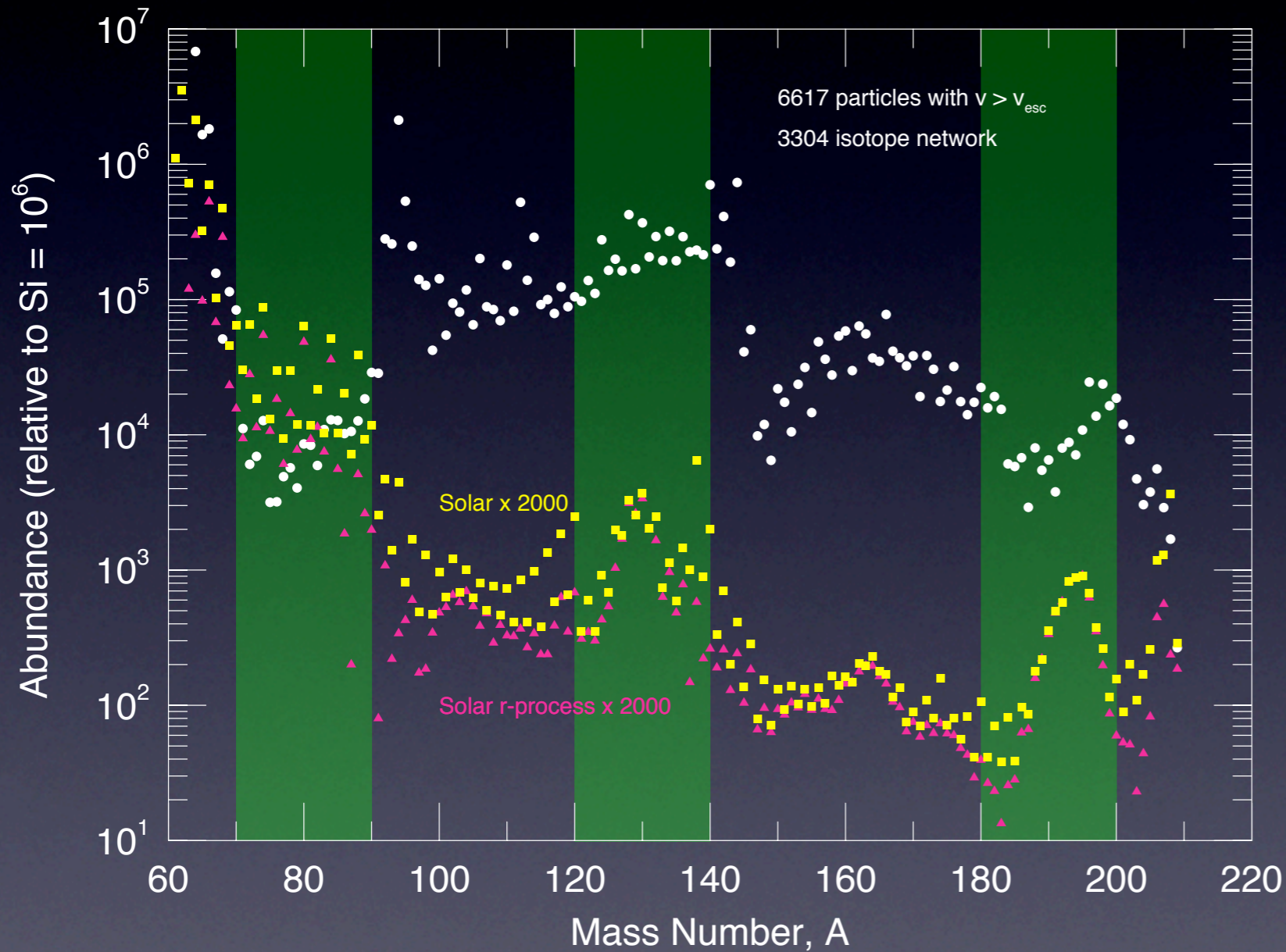
- Nucleosynthesis of fallback ejecta in core-collapse supernova.



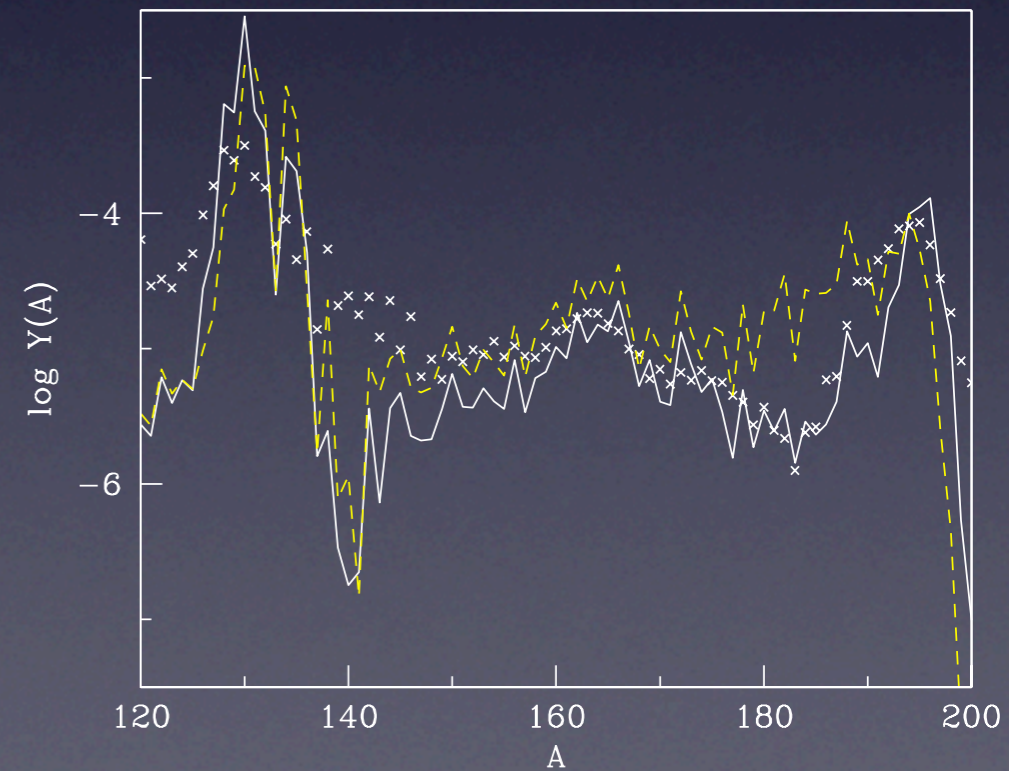
Fryer et al. 2006
LANL

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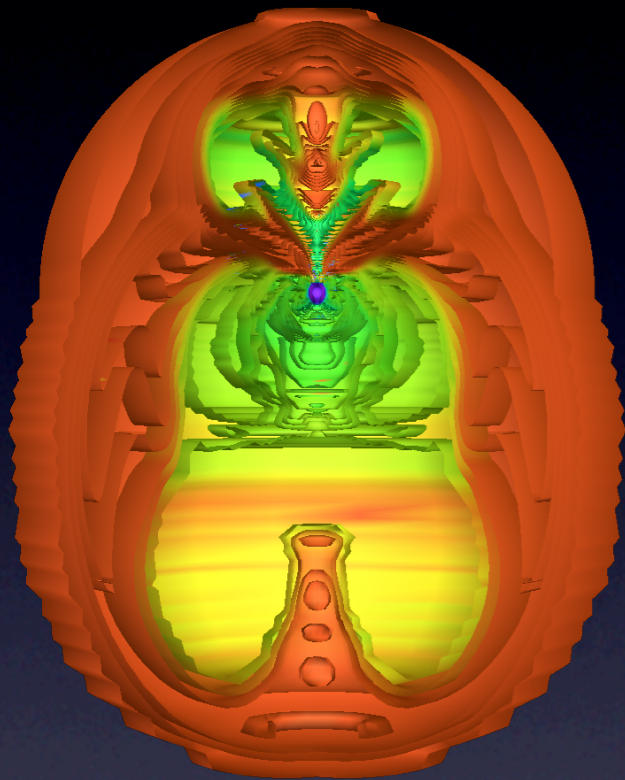
Fryer et al. 2006
LANL



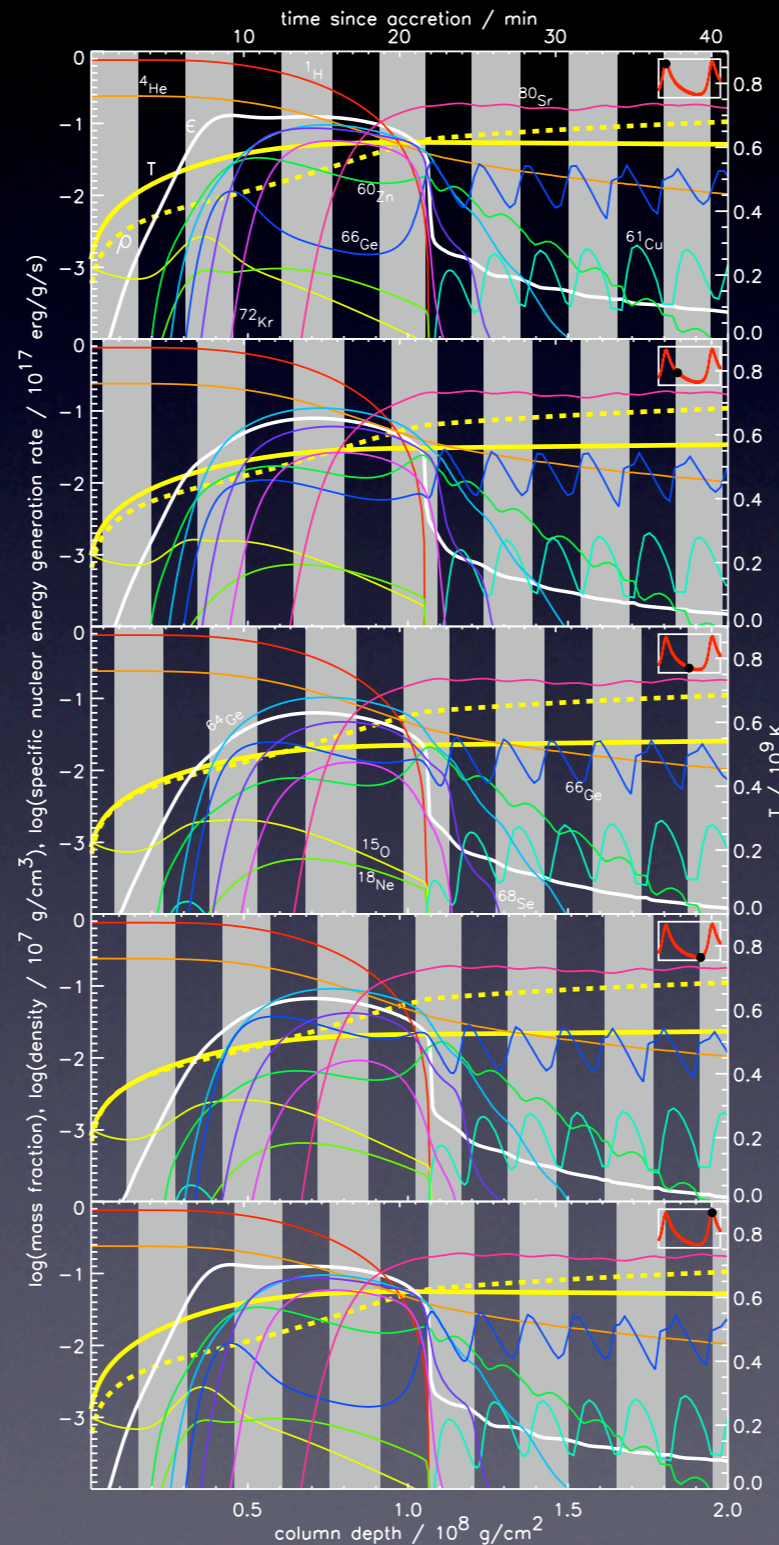
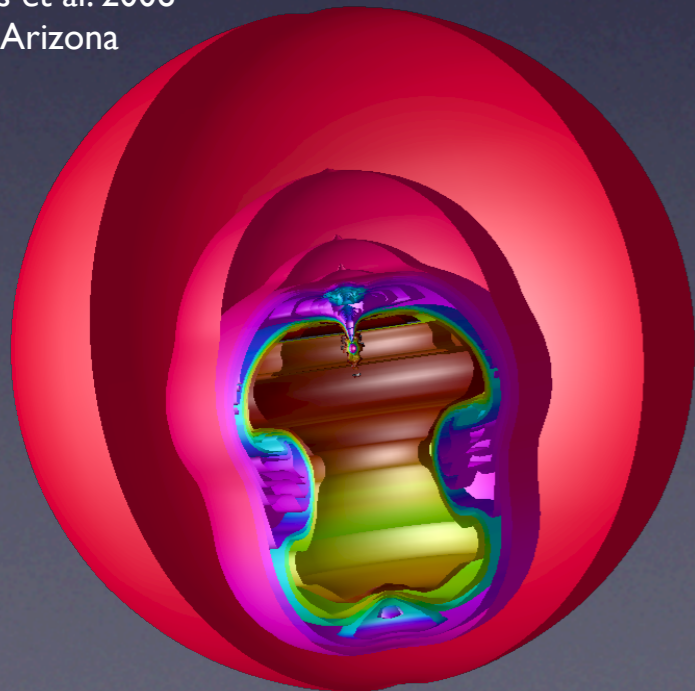
Engel et al. 1999
LANL

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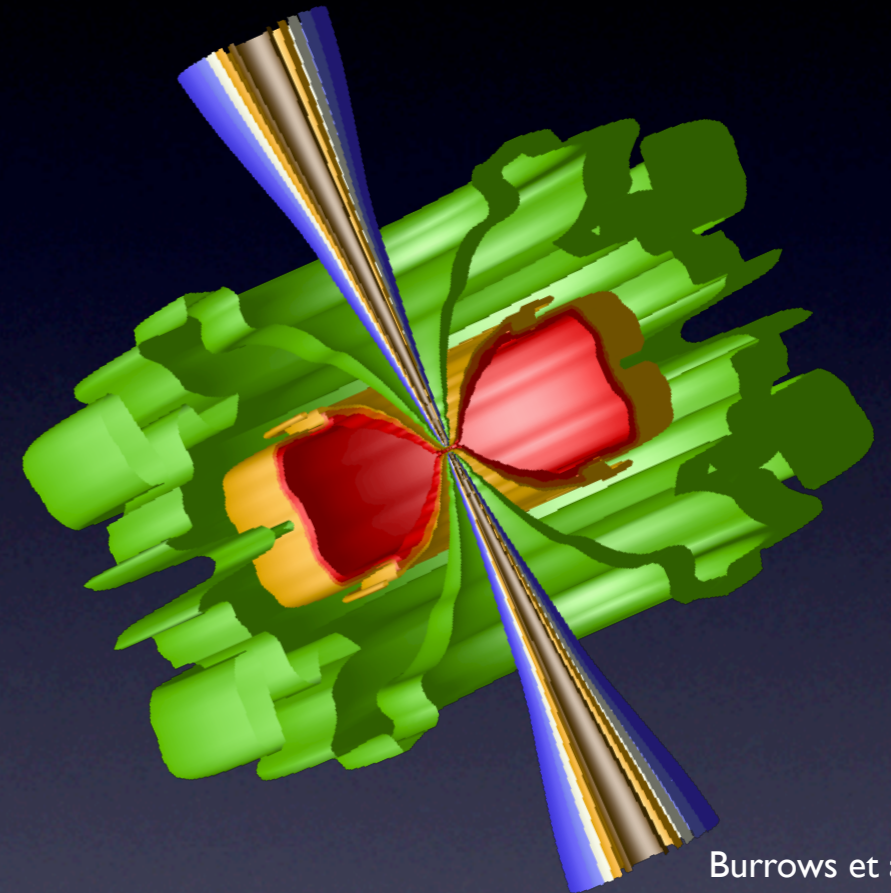
- New core-collapse and thermonuclear supernovae models.
New models of quasi-periodic oscillations from X-ray binaries.



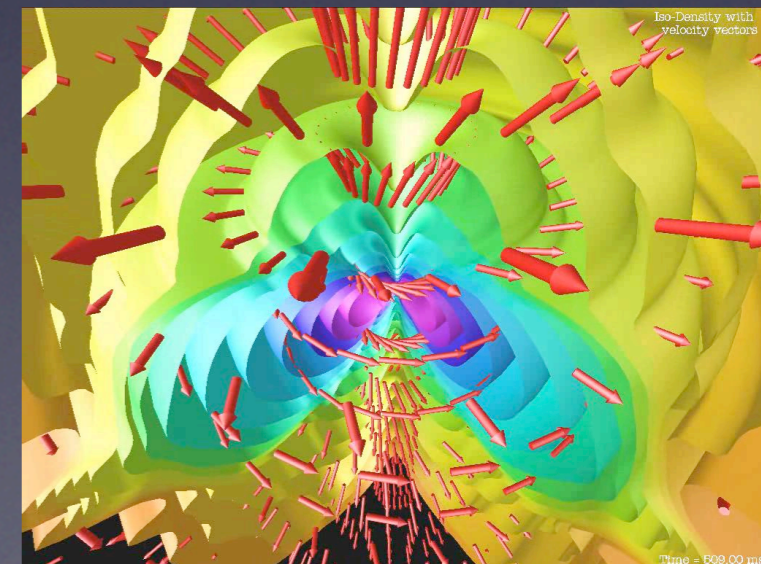
Burrows et al. 2006
Univ. of Arizona



Heger et al. 2004, LANL/UCSC



Burrows et al. 2006
Univ. of Arizona



Time = 508.00 ms

JINA is instrumental in boosting scientific progress.

- Sm-Eu-Gd: a collaborative multi-physics, multi-institution project

Astrophysics modeling: Provide theory and simulation to link nuclear experiment to astronomy observable → improve predictive science.



Herwig, 2005

T-6/X-2/CCS-2/JINA

Presolar grains: First individual grain isotopic measurements for multiple elements, Sm-Eu-Gd, with new technology (CHARISMA) at Argonne. Collaboration letter received.

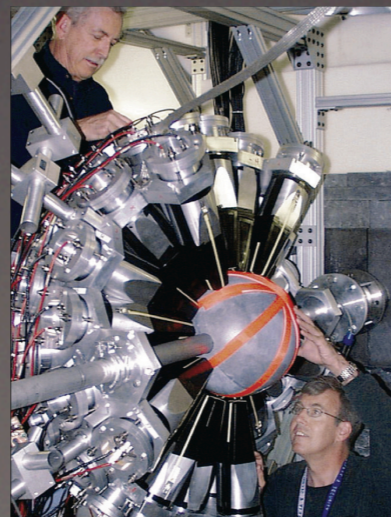


Amari, 1998

Nuclear Physics Experiments with DANCE:

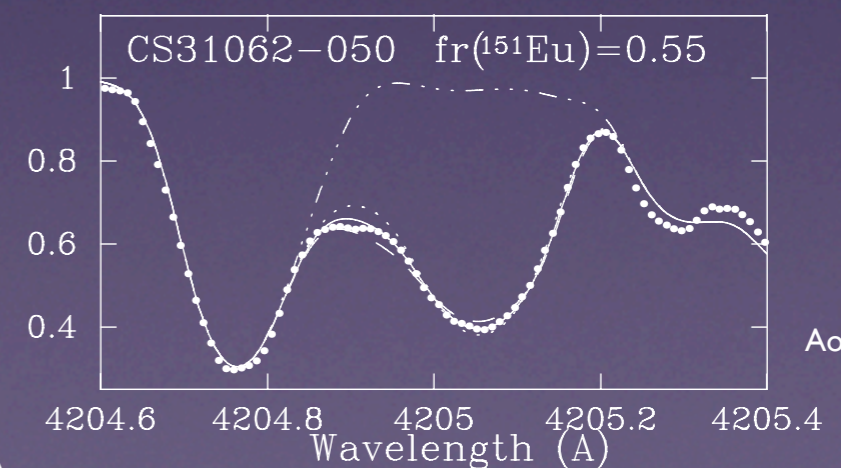
- (n,γ) measurements of radioactive samples with 4π BaF₂ array that can't be done anywhere else.

- First complete experimental data coverage for an entire branching region.



LANSCET-16/JINA

Astronomy Observations: Systematic Eu hyperfine splitting campaign to determine Eu isotopic ratios in extremely metal poor stars, sample in part from SEGUE/SDSS-II candidates.

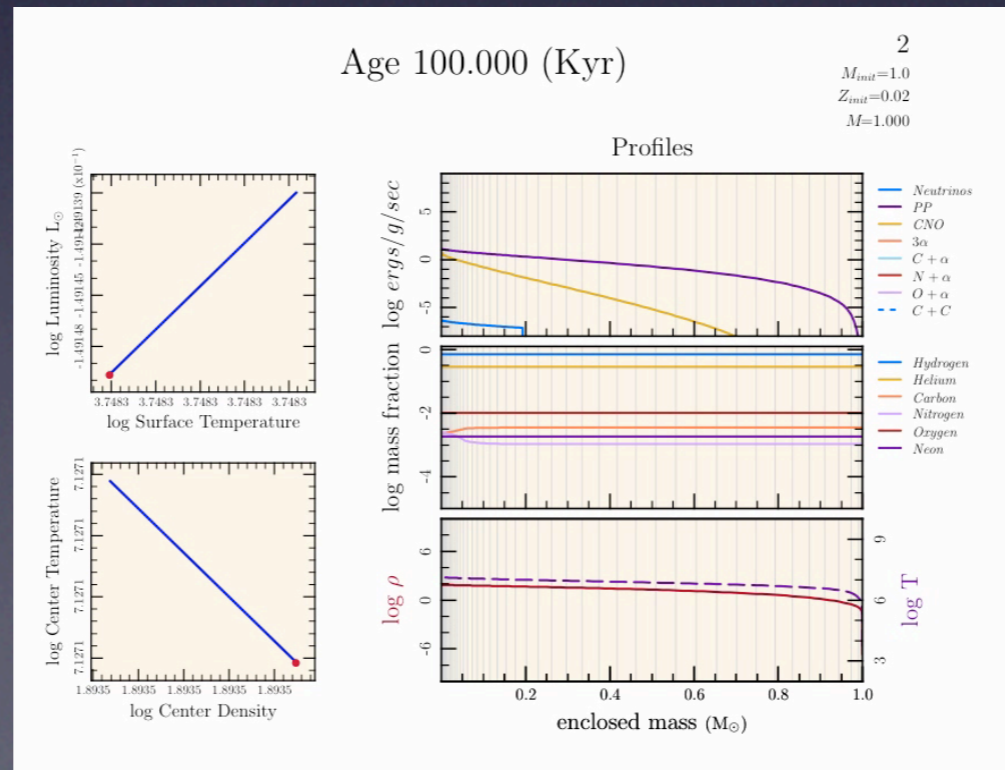
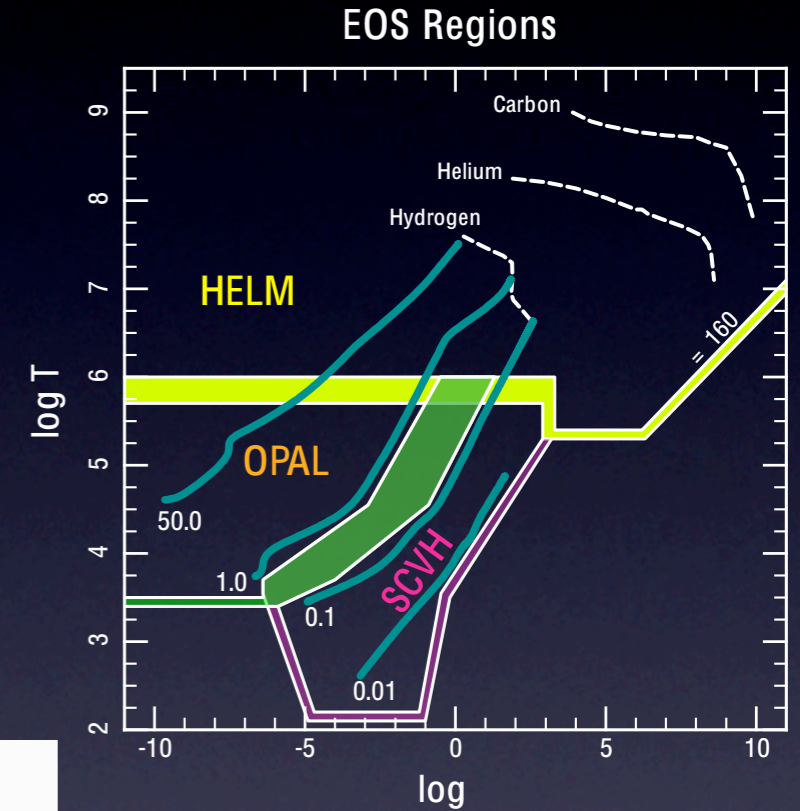
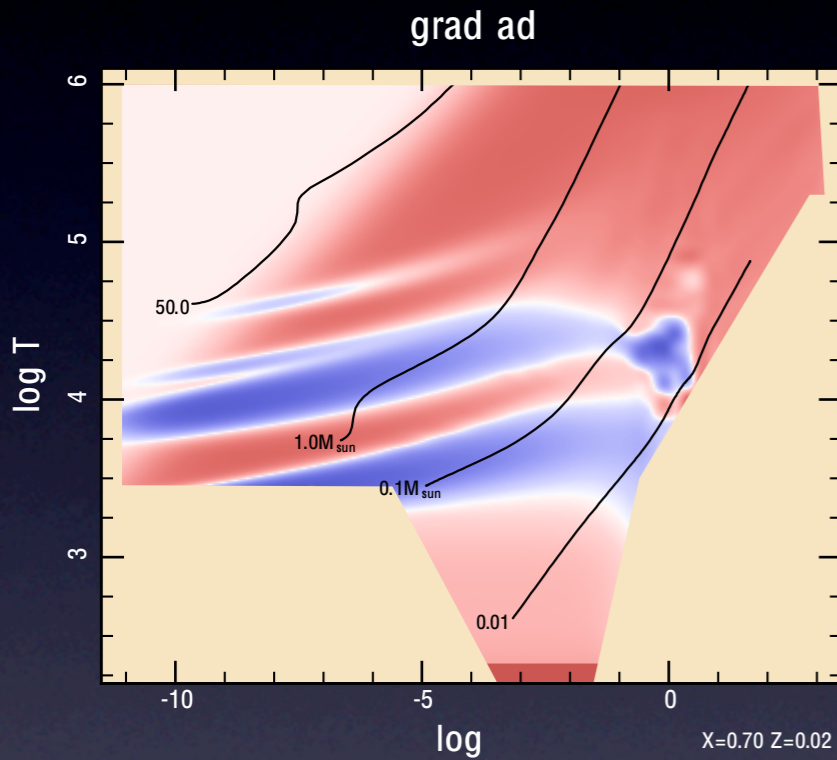


Aoki et al. 2003

MSU/JINA

JINA is instrumental in boosting scientific progress.

- Developing next-generation stellar evolution / stellar dynamics codes.



JINA is playing a vital role in developing the next generation workforce.

- Schools at Notre Dame and MSU
- Grad student visitors LANL: Georgios Magkotsios, Fang Peng, Tim Ashenfelter, Marco Pignatari, David Chamulak
- Postdocs visitors at LANL: Laurent Piau, Aaron Couture, Sanjib Gupta, Mark Wallace (Agnew Fellow)
- Research associates at LANL: Ulrich Geppert, Matthias Reinhard, Bernd Freytag



R-Matrix School
October 2004



Nuclear Reaction Network Techniques
June 2005



The Nuclear Shell Model Applications
February 2006

JINA is pivotal in building up collaborations in nuclear astrophysics.

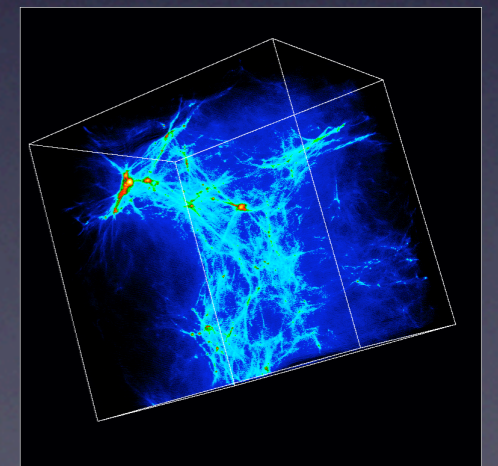
- LANL/JINA workshops and conferences at the Aspen Center for Physics, Kavli Institute for Theoretical Physics, Institute for Nuclear Theory, and Santa Fe.
- LANL hosted 18 JINA affiliated visitors in 2005-2006, including Wiescher, Schatz & Truran.



Physics of the s-process in Aspen sponsored by:
JINA
Institute of Geophysics and Planetary Physics (IGPP)
Institute of Nuclear and Particle Astrophysics and Cosmology (INPAC)
University of California Directed Research and Development (UCDRD)
Los Alamos Neutron Science Center (LANSCE)



Chemical Enrichment of the Early Universe in Santa Fe sponsored by:
JINA
Institute of Geophysics and Planetary Physics (IGPP)
Center for Space Science and Exploration
Scientific Discovery Through Advanced Computing (SCIDAC)



JINA complements and leverages for several new funding opportunities.

- Laboratory Directed Research and Development (LDRD)
 - 2004 - \$1.5M/year, First Stars, Alex Heger
 - 2005 - \$250K/year, s-process, Rene Reifarth
 - 2006 - \$1.2M/year and two \$230K/year proposals pending
- Scientific Discovery through Advanced Computing (SCIDAC)
 - 2006 - \$1M/year, Burning and Mixing, Paul Woodward, pending
 - 2006 - \$1M/year, Supernova, Stan Woosley, pending
- Accelerated Strategic Computing (ASC)
 - Bidder's meeting 16May2006
 - 2007 - \$4M/year
 - 2008 - \$800K/year
- Joint Dark Energy Mission (JDEM, DOE/NASA)
 - 2007 - Destiny study, \$2M for 2 years, Todd Lauer, pending
 - 2007 - JEDI study, \$2M for 2 years, Yun Wang, pending