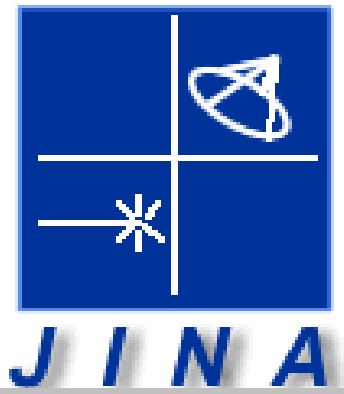



# - JINA -

## *Joint Institute for Nuclear Astrophysics*
## NSF-Physics Frontier Center

M. Wiescher, University of Notre Dame

- Institutions & Collaborations
- Concept & Goals
- People & Growth
- Achievements & Directions
- Advise & Encouragement

# Participants & Applicants

JINA COOPERATIVE AGREEMENT
PHY-0216783 since August 1, 2003

| | |
|---|---|
| Proposing Institutions: | University of Notre Dame<br>Michigan State University<br>University of Chicago |
| Associate Institutions: | Argonne National Laboratory<br>University of Arizona<br>UC Santa Barbara<br>UC Santa Cruz |
| Applying Institutions: | Los Alamos National Laboratory<br>TRIUMF, Canada<br>VISTAR (Mainz, GSI, Germany)<br>Hashemite Kingdom of Jordan |

# Participating Colleges and Committees

**Participating Colleges:**

Ball State, IN
Hope College, MI
Indiana University South Bend, IN
Southern Indiana University, IN
SUNY, Geneseo, NY
Western Michigan University, MI
Clark Atlanta University, GA
Xavier University, LS
St. Edwards University, TX
St. Mary's University, TX

**Executive Committee:**

S. Austin (MSU);
L. Bildsten (UC Santa Barbara)
E. Rehm (ANL);
H. Schatz (MSU)
J.W. Truran (U. Chicago)

**Outreach Advisory Committee:**

P. DeYoung (Hope)
K. Johnston (Elkhart Highschool)
D. Pope Davis (CANDAX-McNair, ND)
J. Hinnefeld (IUSB)
M. Thoennessen (MSU)

# The role and purpose of Physics Frontier Centers

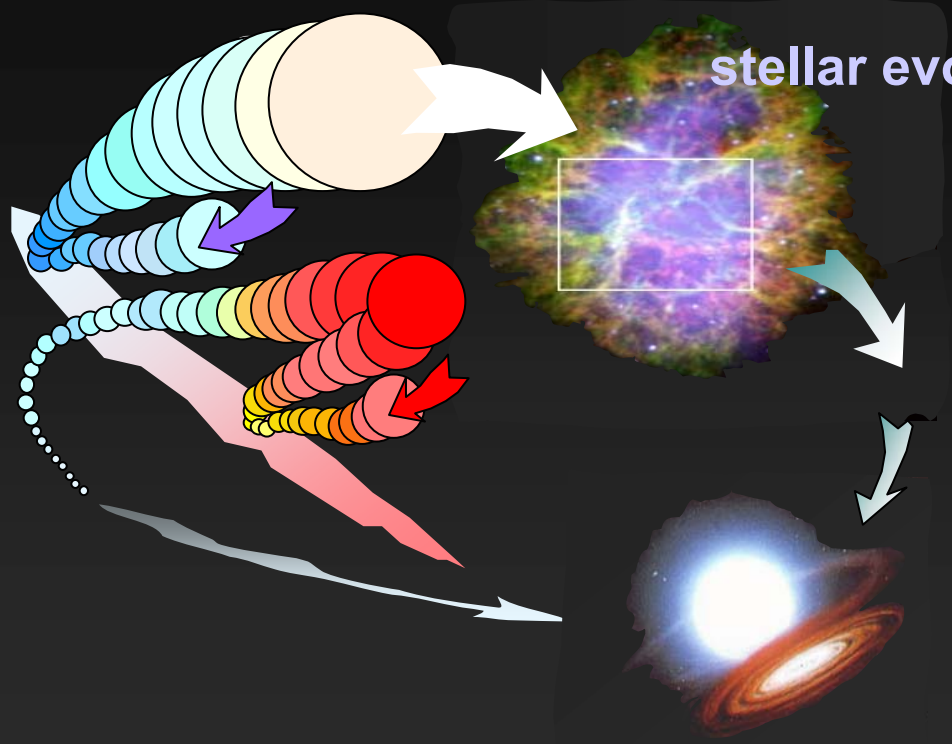
This program has been established to enable major advances at the intellectual frontiers of physics by providing resources to individual investigators or small groups. The program supports university-based centers to make transformational advances in the most promising research areas. PFCs should address major challenges that require, infrastructure and large collaborations that catalyze rapid advances on most promising research topics. The successful PFC will demonstrate:

- the potential for a profound advance in physics;
- creative, substantive activities aimed at enhancing education, diversity, and public outreach;
- potential for broader impacts, e.g., impacts on other field(s);
- a synergy or value-added rationale that justifies this approach.

# JINA as NSF PFC center the science concept

- Stimulating goal oriented research initiatives
  - MRC-1 Type II supernova nucleosynthesis
  - MRC-2 Accreting neutron star systems
- Initiating cross-talk and collaborations
  - joint initiatives between observer, modeler, and experimentalist
  - mix and exchange of postdocs and students
- Providing new methods and opportunities for the field
  - development of computational tools and techniques (HD, MHD)
  - development of experimental techniques and tools for future facility projects (RIA, NUSEL, neutron beams)

# JINA Research Focus & Major Research Components, MRC



## MRC1: the origin of elements

**stellar evolution & type-II SN nucleosynthesis**

- **low energy nuclear reactions**
- **r-process nucleosynthesis**
- **p-process nucleosynthesis**

## MRC2: fate of matter on accreting neutron stars

- **rp-process**
- **electron capture processes**
- **pycno-nuclear reactions**

# JINA as NSF PFC center the outreach concept

- Developing new concepts for communication & exchange
  - Organization of goal oriented workshops on MRC related topics
  - Support for conferences & workshops in the field
  - Training courses and schools
  - Web based course development
  - JINA Journal development (Virtual Journal & Reaclib Journal)
- Outreach
  - Outreach through art and entertainment
  - Outreach through support of existing programs
  - Outreach through research and training

# The International Advisory Committee

The International Advisory Committee advises the director on JINA activities on a regular basis. The committee will elect its own chair. The committee will consist of ten external members (who may also be JINA associates) plus one JINA PI or Senior Investigator. Its membership will include astronomers, nuclear theorists, nuclear experimentalists, and nuclear astrophysicists. Members of this Advisory Committee serve a three year term; candidates for membership are nominated by a nomination subcommittee and elected by vote of the JINA investigators.

The function of this committee, which will meet once a year, will be to review Center activities and provide a written report to the Director and the Vice President of Research on the status of the Center and policy issues. Specific advice may include: research directions for JINA; proposals for workshops, symposia, and summer schools; and major equipment proposals.

# Scientific Personnel

| | |
|---|---|
| **Sanjib Gupta - MSU**<br>Global description for electron capture rates,<br>Network simulations in neutron star crust | **August 2003 –** |
| **Wolfgang Rapp – MSU ⇒ ND**<br>p-process nucleosynthesis simulations and flow analysis | **November 2003 –** |
| **Leandro Gasques - ND**<br>Nuclear potential models for pycnonuclear reactions | **October 2003 -** |
| **Kaori Otzuki – ND ⇒ Chicago**<br>r-process simulations & neutrino winds | **January 2004 –** |
| **Jacob Fisker – ND**<br>XRB nucleosynthesis in multi-mass zone modeling<br>MHD and HD in type II SN shocks | **April 2004 –** |
| **Dean Townsley – UCSB ⇒ Chicago**<br>Accreting white dwarfs and neutron star systems | **Jan. 2004 -** |

# JINA visitors

(without seminar speakers!)

**R.E. Azuma, U. Toronto, Canada – Aug. 2003, Oct. 2003, Feb.2004, Apr. 2004**
r-matrix modeling

**G. Berg, KVI, Netherlands – Aug. 2003**
St. George development

**H. Constantini, Gran Sasso Laboratory, Italy – Mar. 2004**
Underground accelerator experiments

**Andrew Cumming University of California at Santa Cruz, Apr. 2004**
XRB modeling

**U. Geppert, Inst. Astrophysics Potsdam, Germany – Mar. 2003**
Neutron star crust behavior, pycno nuclear processes

**M. Heil, FZ Karlsruhe, Germany – Feb. 2004**
r-matrix modeling

**D. Hutcheon, TRIUMF, Canada – Nov. 2003**
St. George development

**J. Jose, Barcelona, Spain – Sept. 2004 – Dec. 2004**
Nova nucleosynthesis

**K.L. Kratz, Universität Mainz, Germany – Oct. 2003, Apr. 2004**
r-process modeling, r-process data compilation

**E. Somorjai, ATOMKI, Debrecen, Hungary – Sept. 2003**
p-process measurements

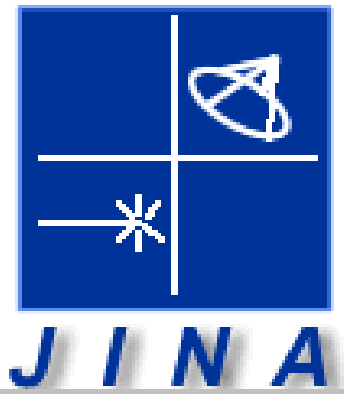
# JINA Students

Support is presently provided for:

11 graduate students at JINA institutions
(3 ND, 3 MSU, 2 UoC, 2 UCSB, 1 UoA)

7 undergraduate students at JINA institutions
(2 ND, 3MSU, 1 UoC, 1 IUSB)

4 visiting students from non-JINA institutions
(1 U.Konstanz, 2 U.Mainz, 1 U.Surrey)




# Conclusions

- JINA is (nearly) fully established
- Activities in research & outreach
- Manpower is nearly completed
- Collaborations have been formed
- Conferences have been organized
- All you want to know about JINA:
  http://www.JINAweb.org