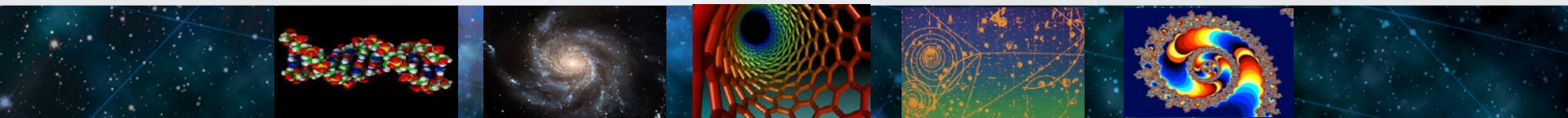




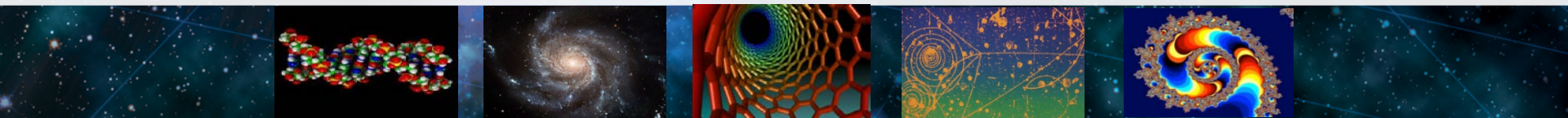
Mathematical and Physical Sciences Advisory Committee (MPS AC)

**F. Fleming Crim
Assistant Director
National Science Foundation
November 3, 2014**



One Good Cosmic Measure: Radio Telescopes Resolve Pleiades Distance Debate

A Science Hors d'Oeuvre



One Good Cosmic Measure: Radio Telescopes Resolve Pleiades Distance Debate Division of Astronomical Sciences (AST)



NOAO/AURA/NSF



Pleiades

L. Girardi, Science **345**, 1001 (2014)

a perspective on the article

A VLBI resolution of the Pleiades distance controversy

C. Melis, M. J. Reid, A. J. Mioduszewski, J. R. Stauffer, G. C. Bower, Science **345**, 1029 (2014)



The Debate

The Pleiades star cluster is a laboratory for studying stellar evolution:
same composition and age but different masses



NOAO/AURA/NSF

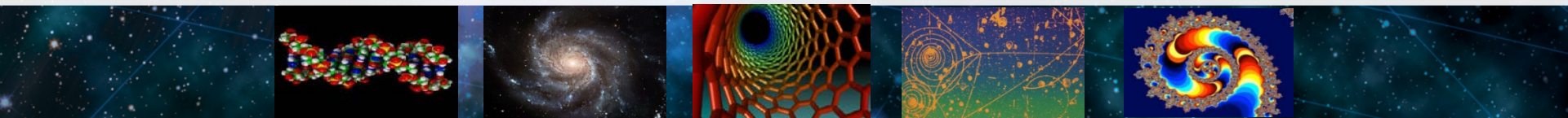


Pleiades

Accurate models depend on precise distances

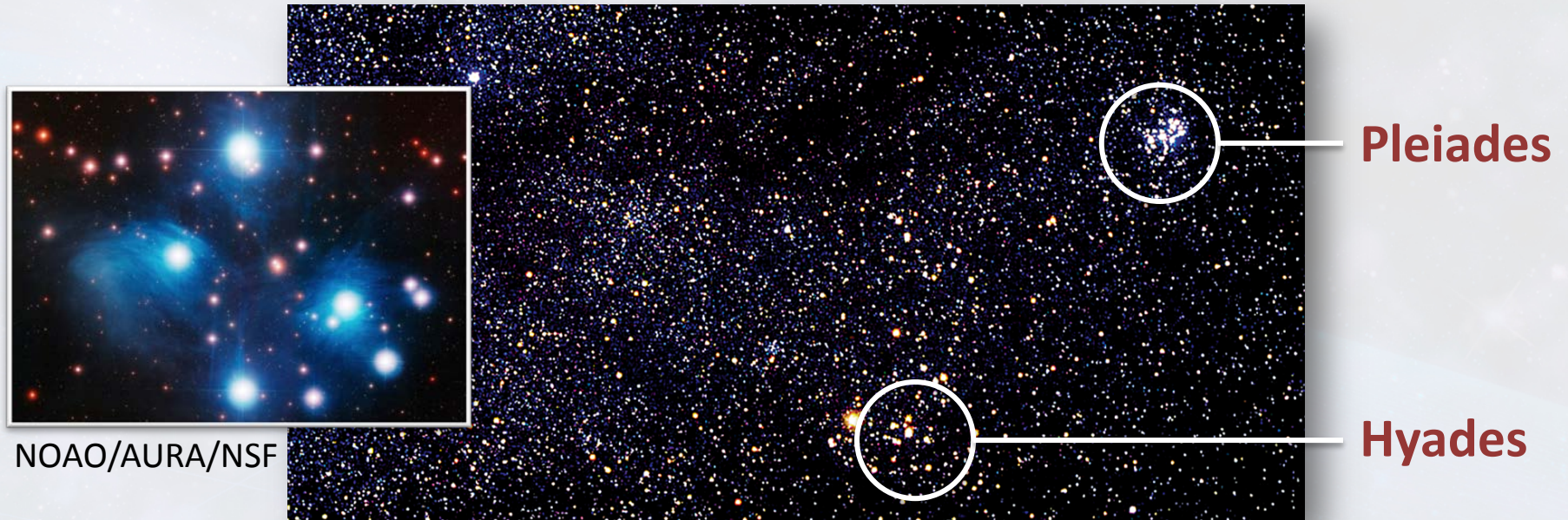
BUT

ground-based observations and stellar models
disagree with satellite data



The Debate

Earlier ground-based observations and stellar models: 435 light years.



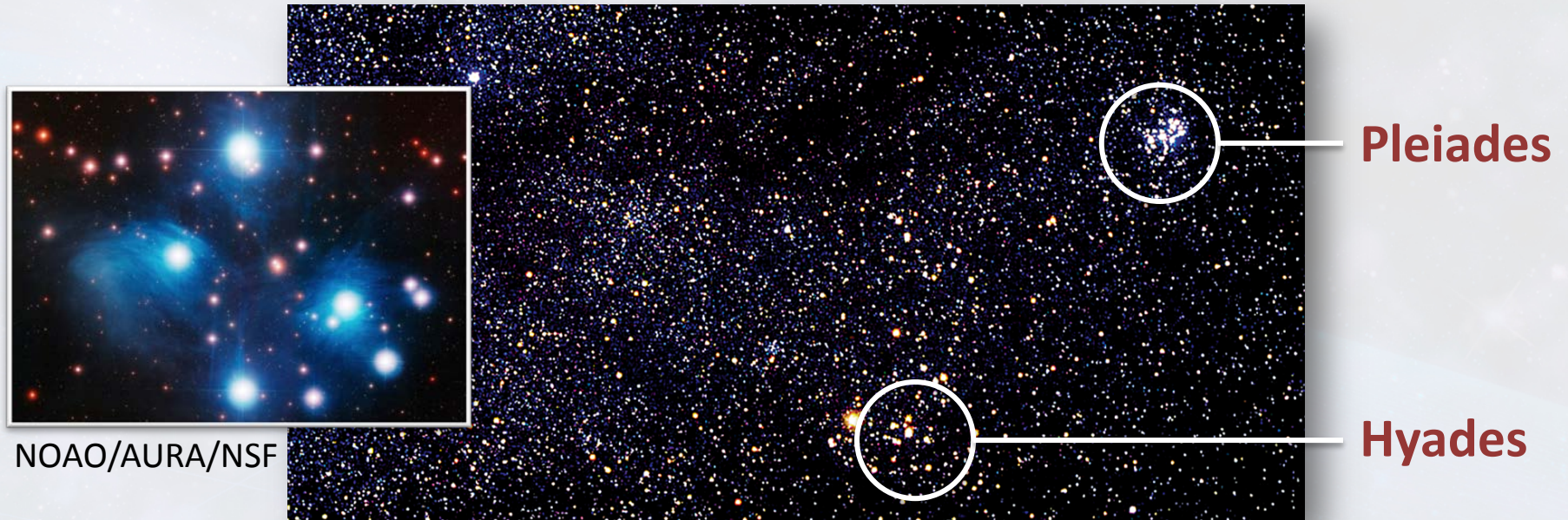
Hipparcos satellite (European Space Agency): 392 light years

Models and measurements are consistent for the Hyades



The Debate

Earlier ground-based observations and stellar models: 435 light years.



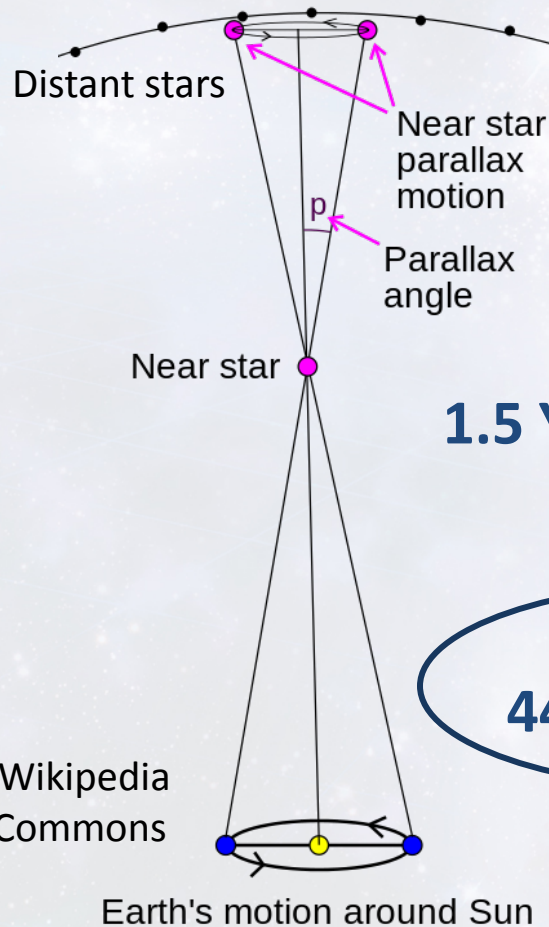
Hipparcos satellite (European Space Agency): 392 light years

Pleiades stars are too faint (unusual stellar physics)
or the satellite measurement is wrong in this case



A Better Measurement: Very Long Baseline Interferometry (VLBI)

Distances from Precise Parallax Measurements



1.5 Year Observation



Distance
444.0 light years

Mauna Kea, HI
Owens Valley, CA
Brewster, WA
North Liberty, IA
Hancock, NH
Kitt Peak, AZ
Pie Town, NM
Fort Davis, TX
Los Alamos, NM
St. Croix, VI



Very Long Baseline Array

Green Bank Telescope

W. E. Gordon Telescope Arecibo

Effelsberg Telescope (Germany)

Wikipedia
Commons



Consequences

**Accurate distances to Pleiades improve stellar models
and improve other distance measurements**

**Warning of Hipparcos anomaly (spatially correlated errors) or
unusual spatial distribution and unidentified physics in Pleiades**

**“At the very least, we have to agree with Melis *et al.*
that **targeted observations using independent methods**
are necessary for a cross check of the parallaxes provided by
global astrometric solutions”**



Reliability and Verifiability

Special Thanks to Pat Knezek



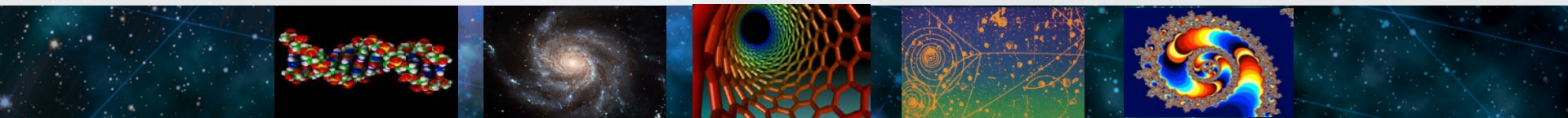
Personnel
and
Plans

Budget

Facilities

Program
Updates

Agenda



New Faces in Office of the Assistant Director



Sara Dwyer
Science Assistant



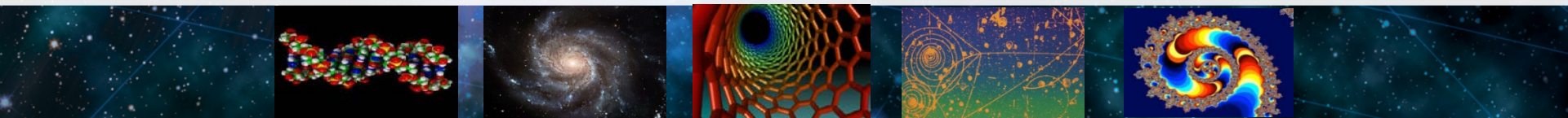
Tiffany Sweat
Administrative
Support Assistant
(PATHWAYS)



Jennifer Pearl
Program Officer
(Detailee DMS)



Eduardo Misawa
Staff Associate
(Detailee ENG/EEC)



Division Leadership

Chemistry



Steve Bernasek
Princeton University
Division Director
Sept 2014 – Feb 2015



David Berkowitz
University of Nebraska
Division Director
Feb 2015 – Aug 2015



Linda Sapochek
Acting Deputy
Division Director

Materials



Carol Bessel
Acting Deputy
Division Director

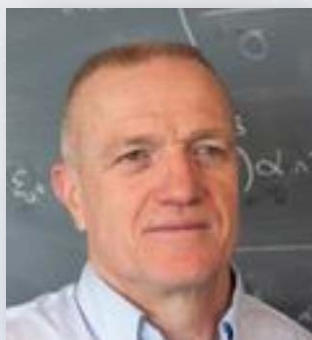
Selection of
Division Director and Deputy Division Director
Underway

Selection of
Deputy Division Director
Underway



MPS AC Membership

Welcome to Three New Members



Robert Bryant
Mathematics
Duke University

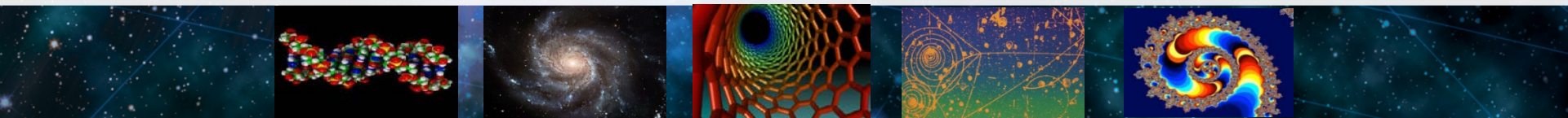


Melanie Sanford
Chemistry
University of Michigan



Bill Zajc
Physics
Columbia University

Total of Eleven Members

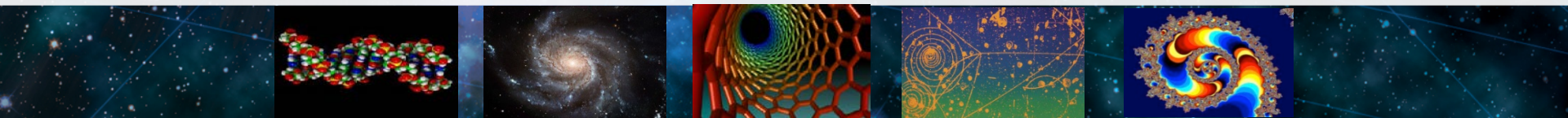


MPS Advisory Committee

Quarterly Meetings

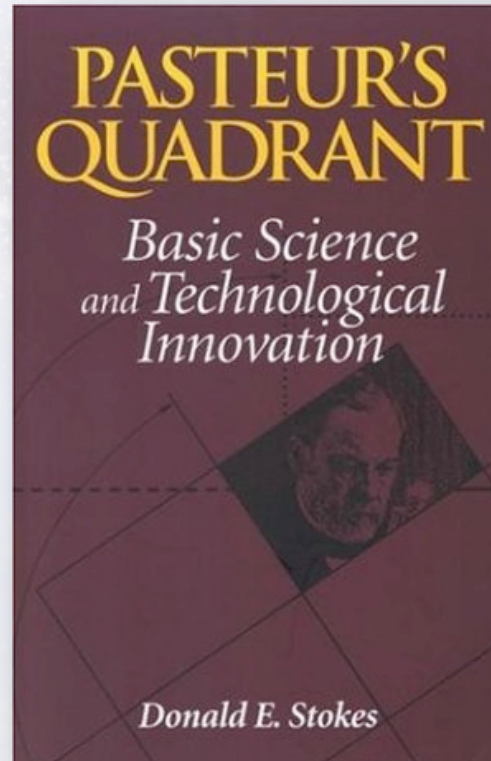
(3 virtual, 1 at NSF)

Next Meeting
(Virtual)
January 23, 2015



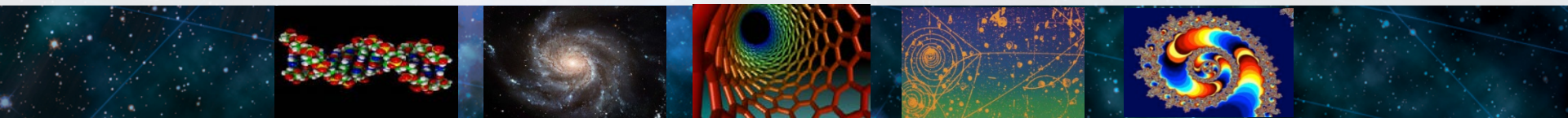
MPS Leadership Retreat Activities

Understanding and Locating MPS and NSF



Donald E. Stokes
Brookings Institution Press, 1997

Image: Amazon.com



Quest for Fundamental Understanding



Bohr

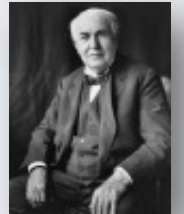
Pure Basic Research

Use-Inspired Basic Research



Pasteur

Pure Applied Research



Edison

Consideration of Use



Quest for Fundamental Understanding



Bohr



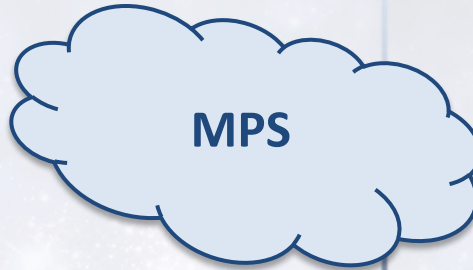
Curie

Pure Basic Research

Use-Inspired Basic Research



Pasteur



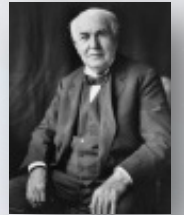
MPS

Chia Pet



(Thanks to Ivy Kupec)

Pure Applied Research

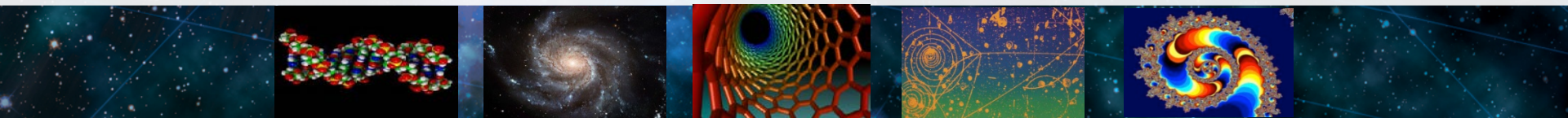


Edison



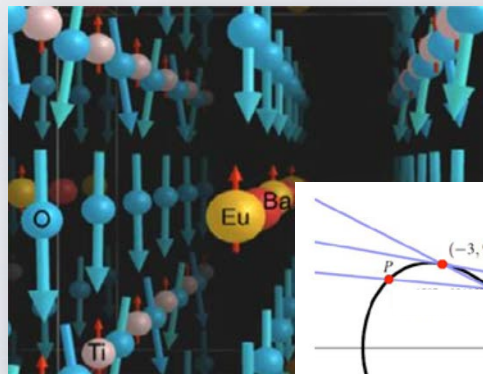
Carver

Consideration of Use

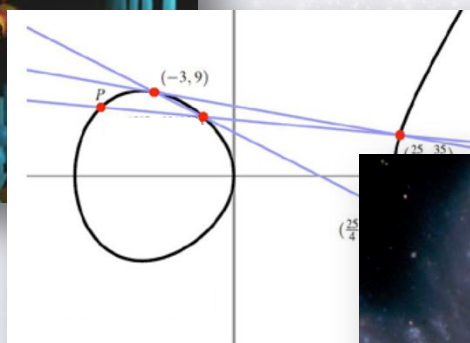


MPS Leadership Retreat Activities

Connections within MPS, within NSF, and to other Agencies



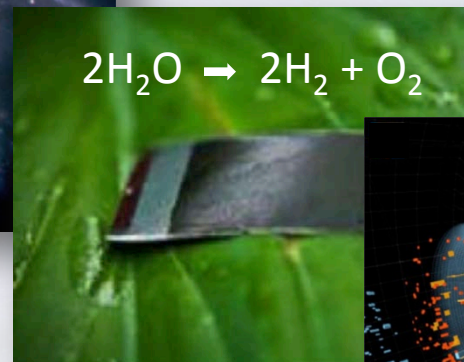
Materials



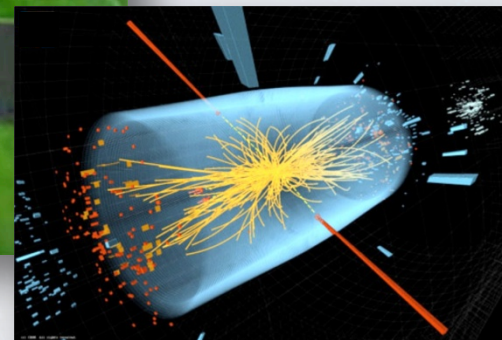
Mathematics



Astronomy



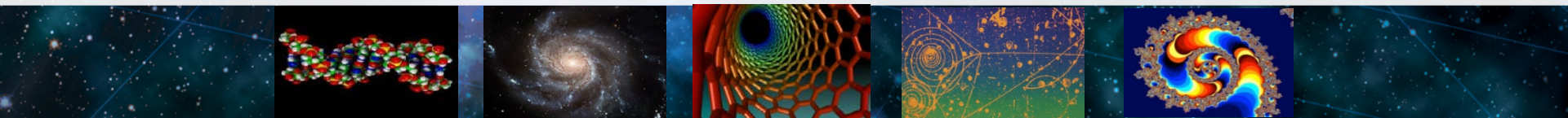
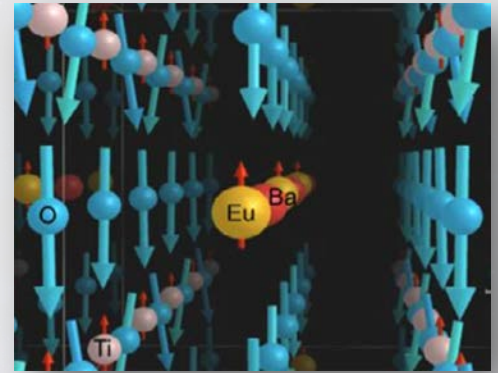
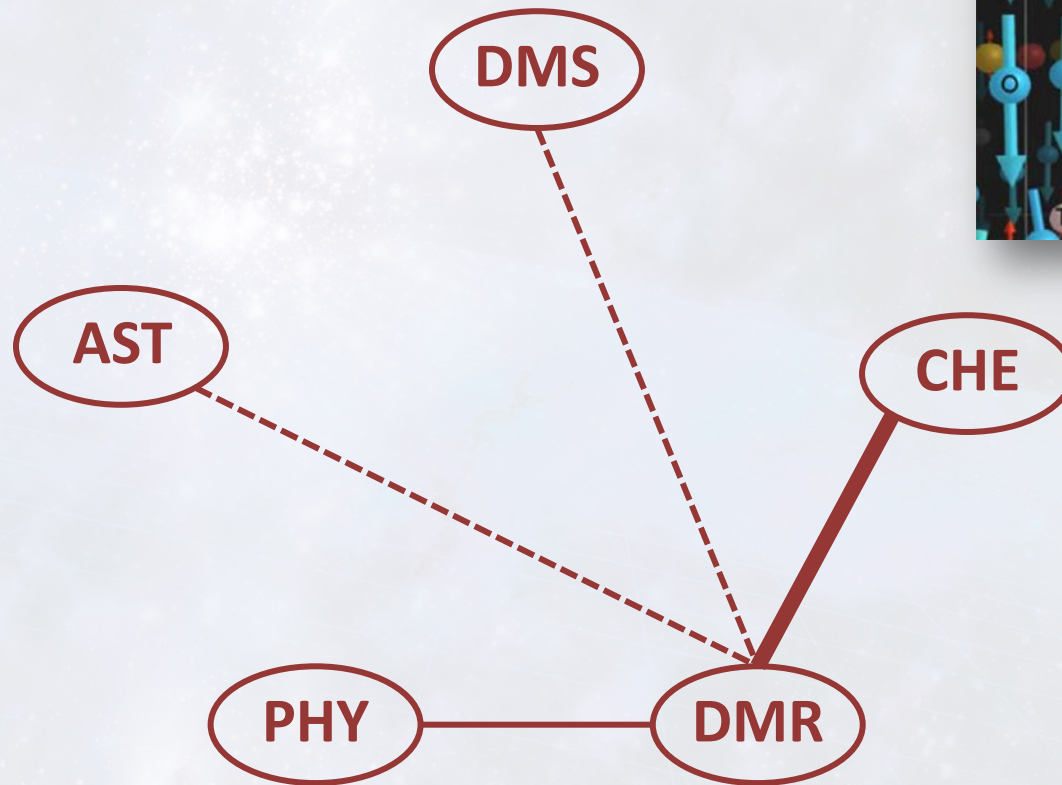
Chemistry



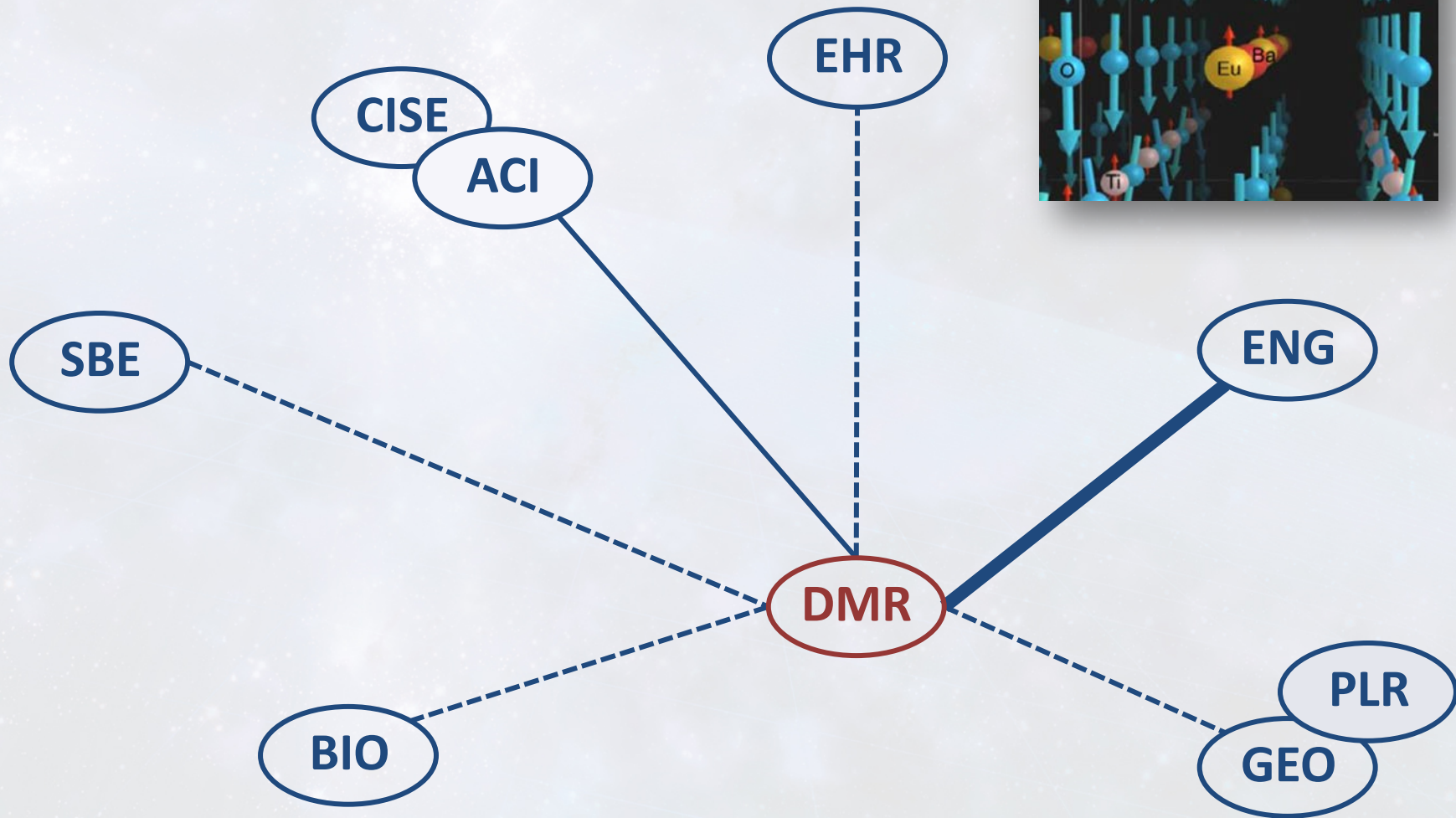
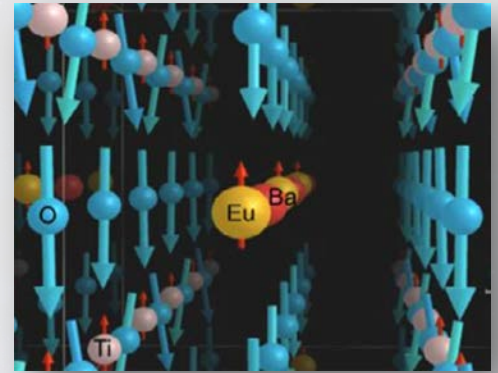
Physics



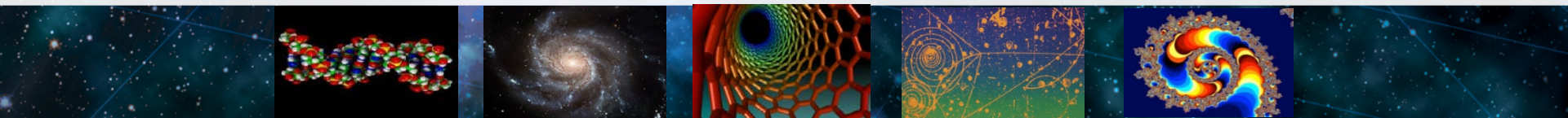
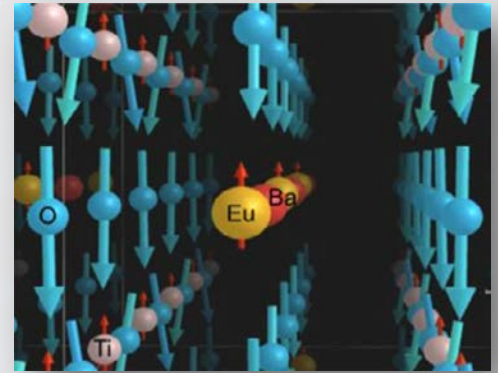
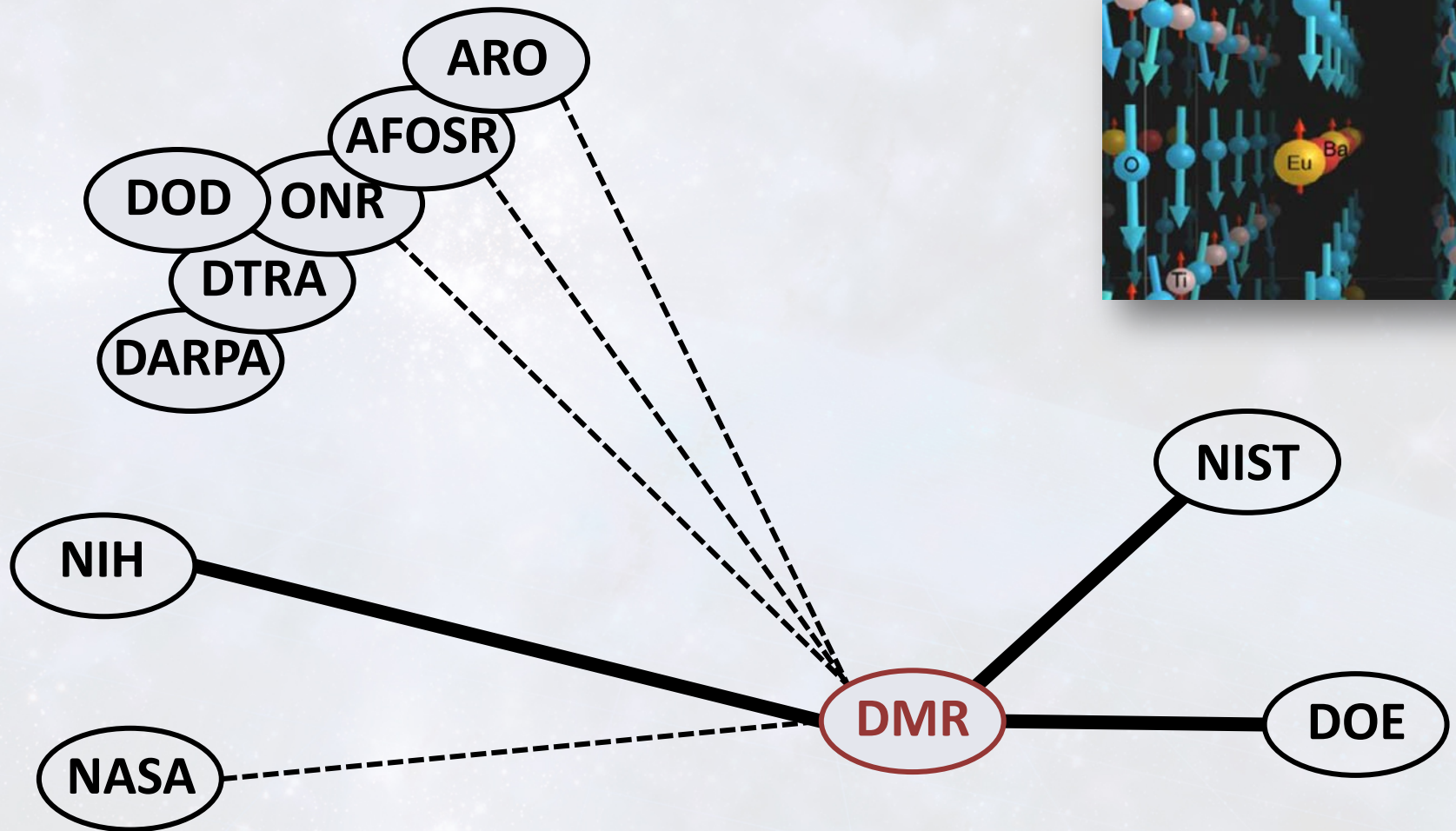
Division of Materials Research (DMR)



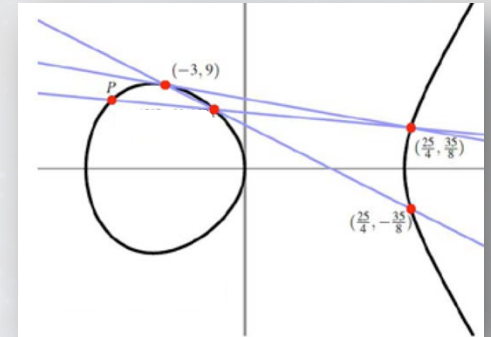
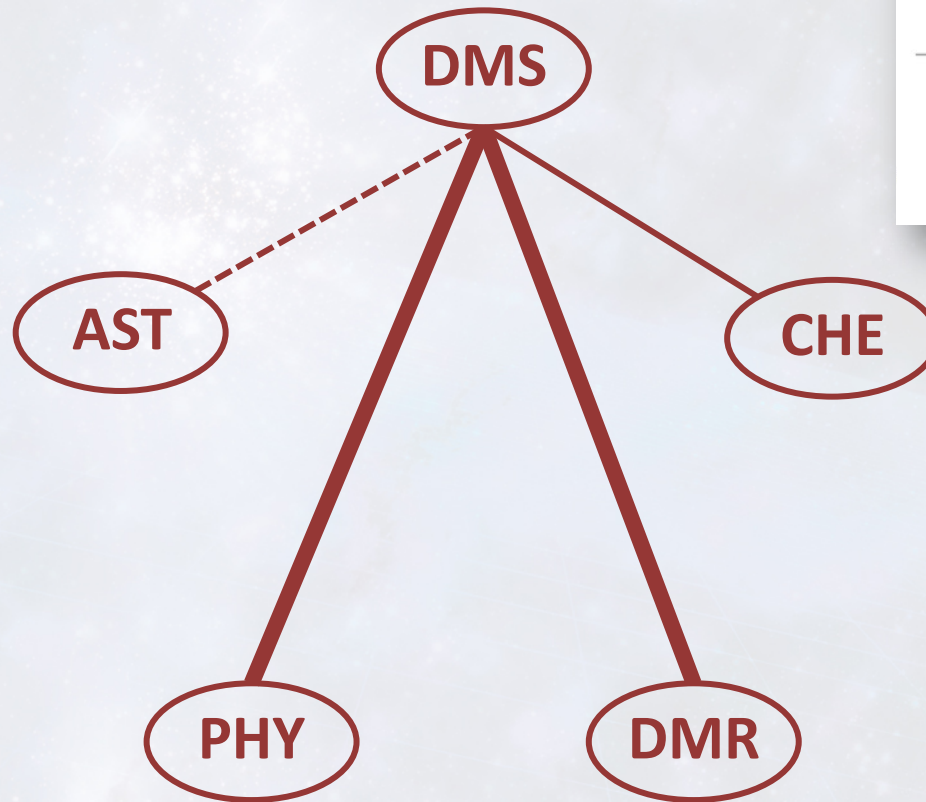
Division of Materials Research (DMR)



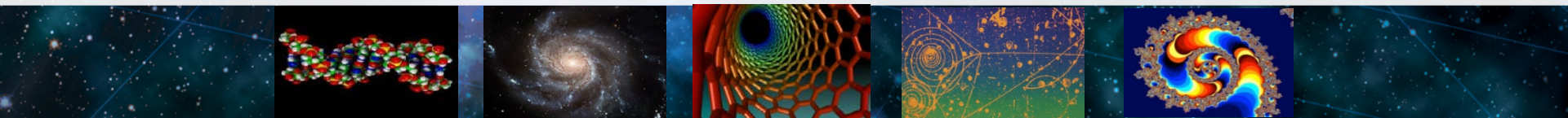
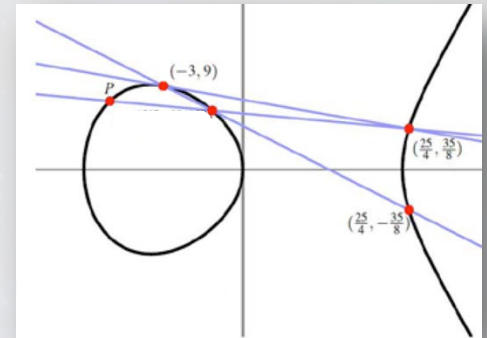
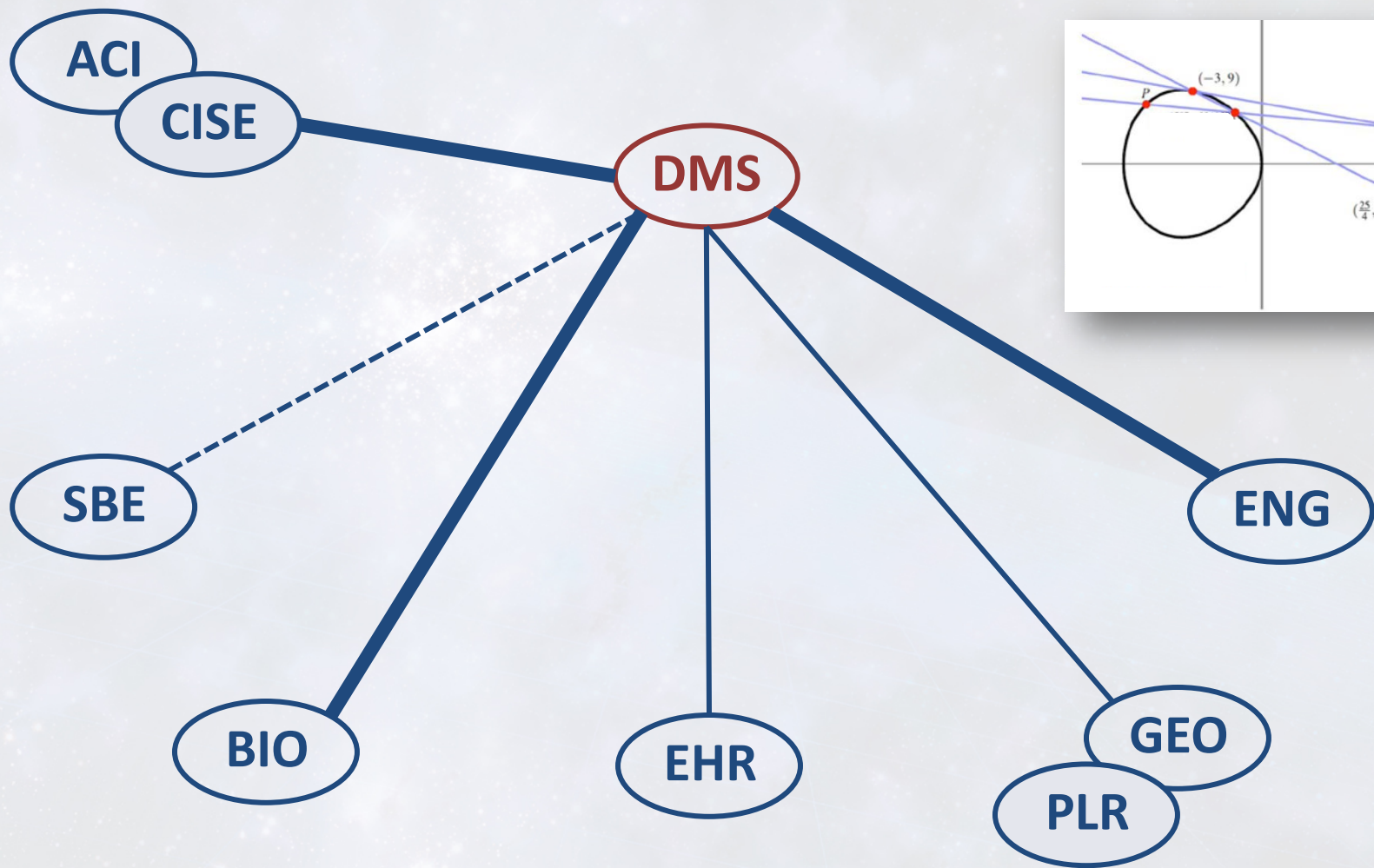
Division of Materials Research (DMR)



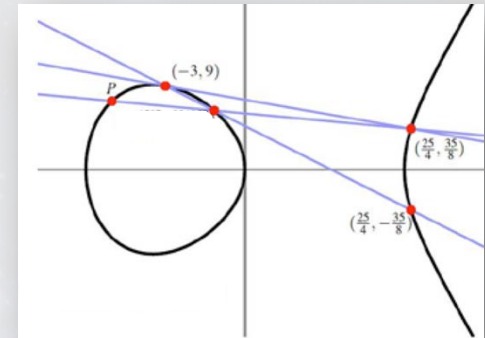
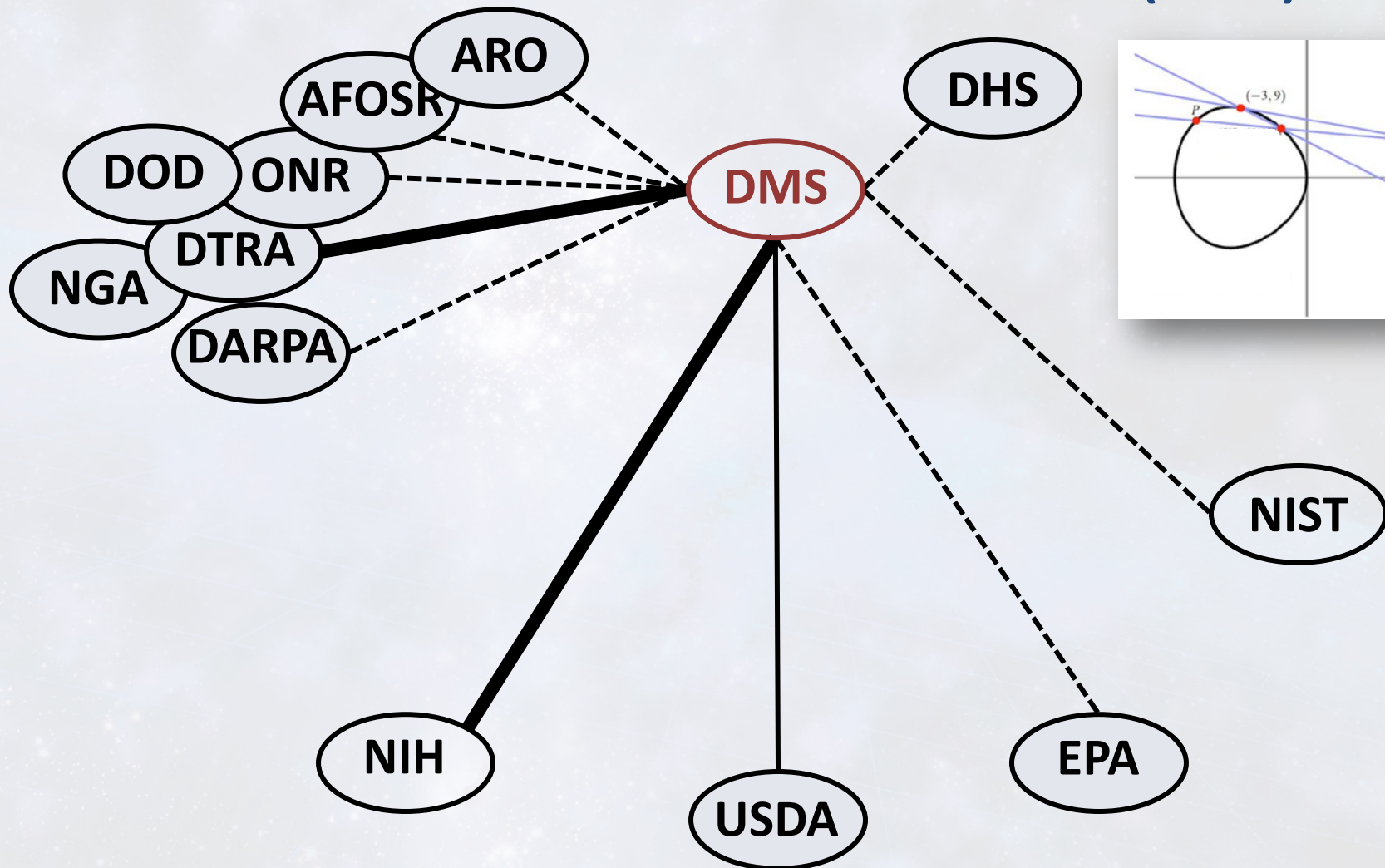
Division of Mathematical Sciences (DMS)



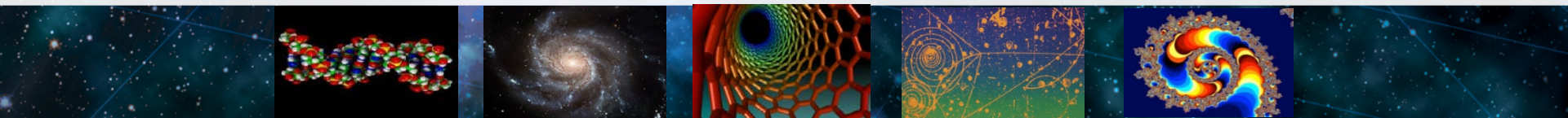
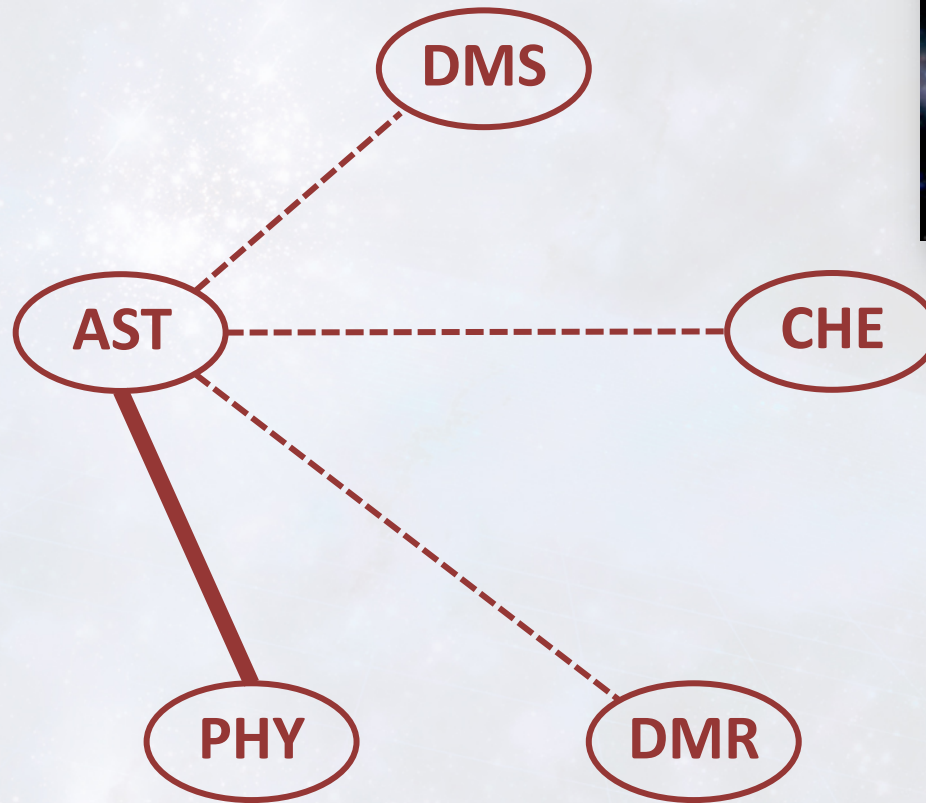
Division of Mathematical Sciences (DMS)



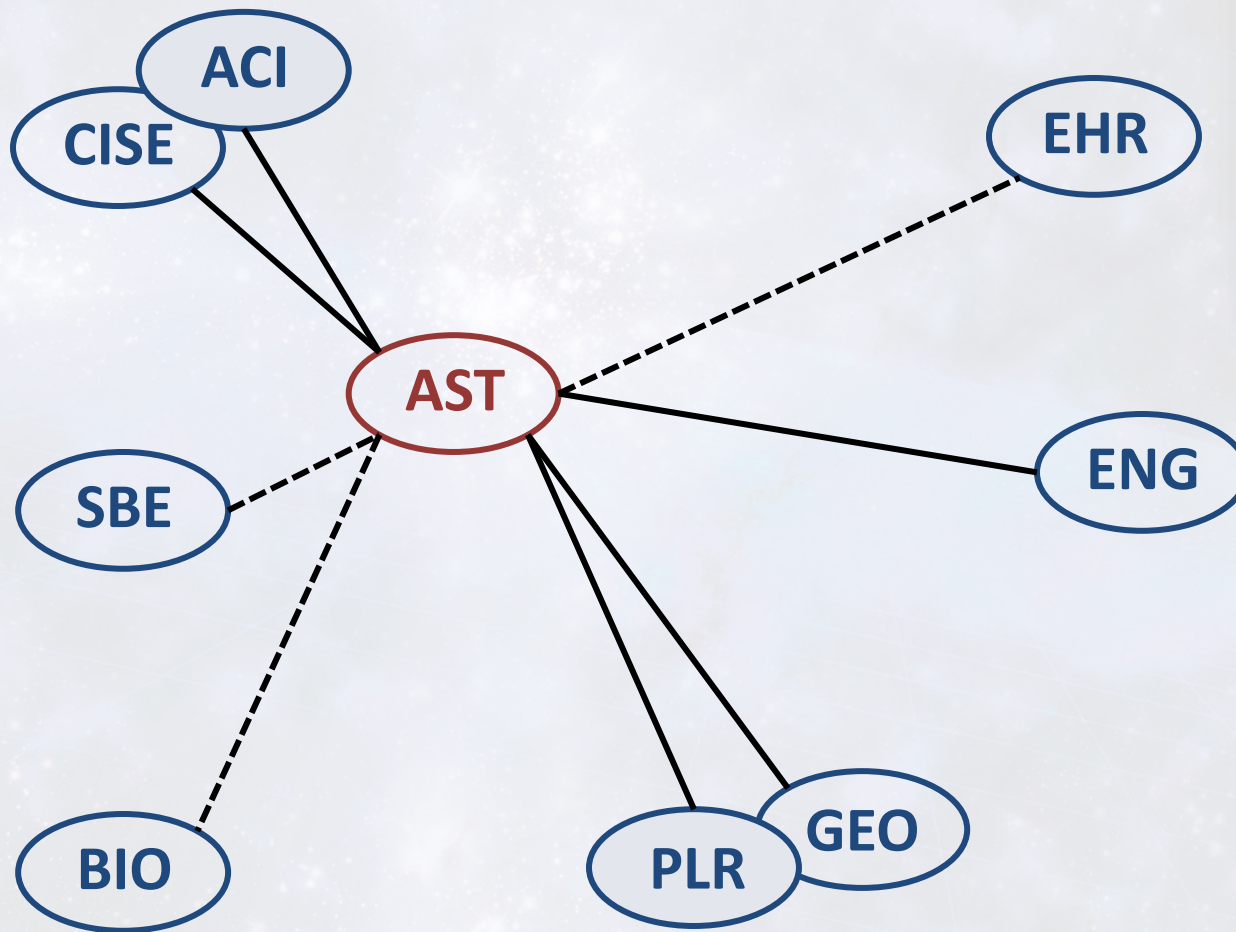
Division of Mathematical Sciences (DMS)



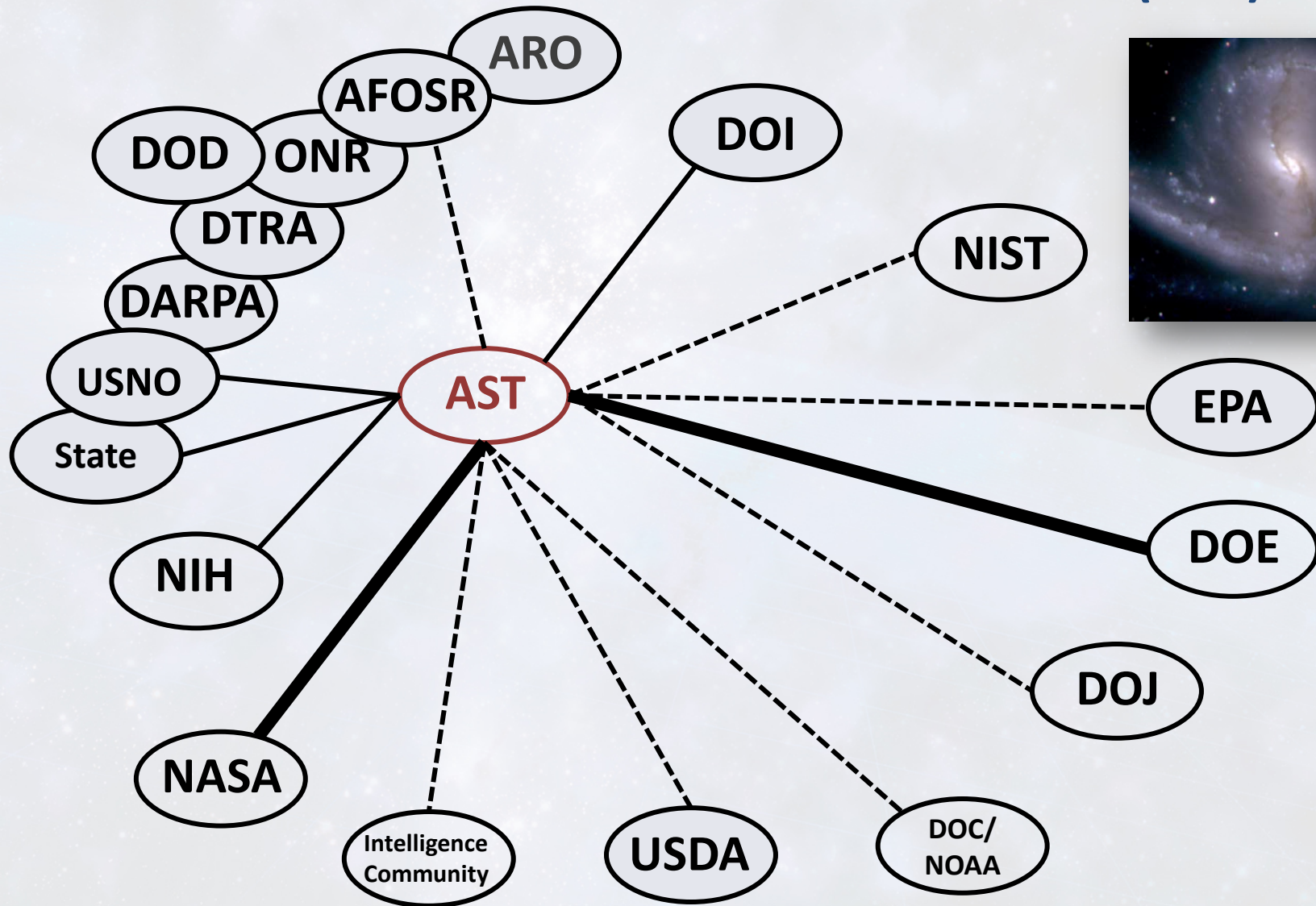
Division of Astronomical Sciences (AST)



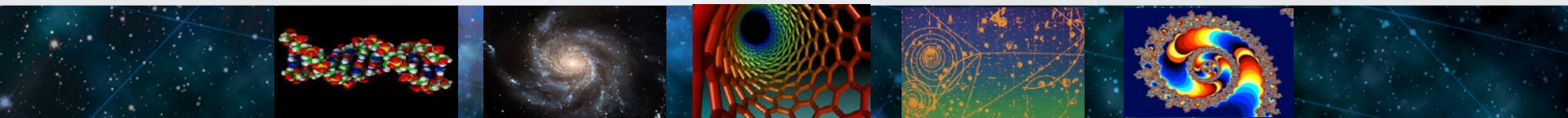
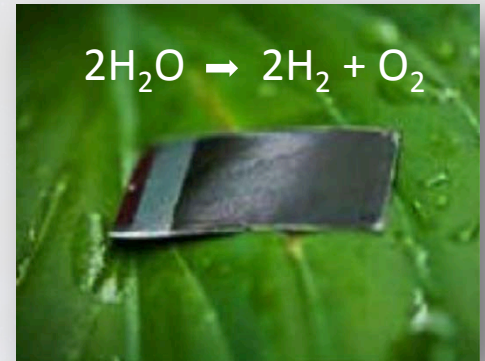
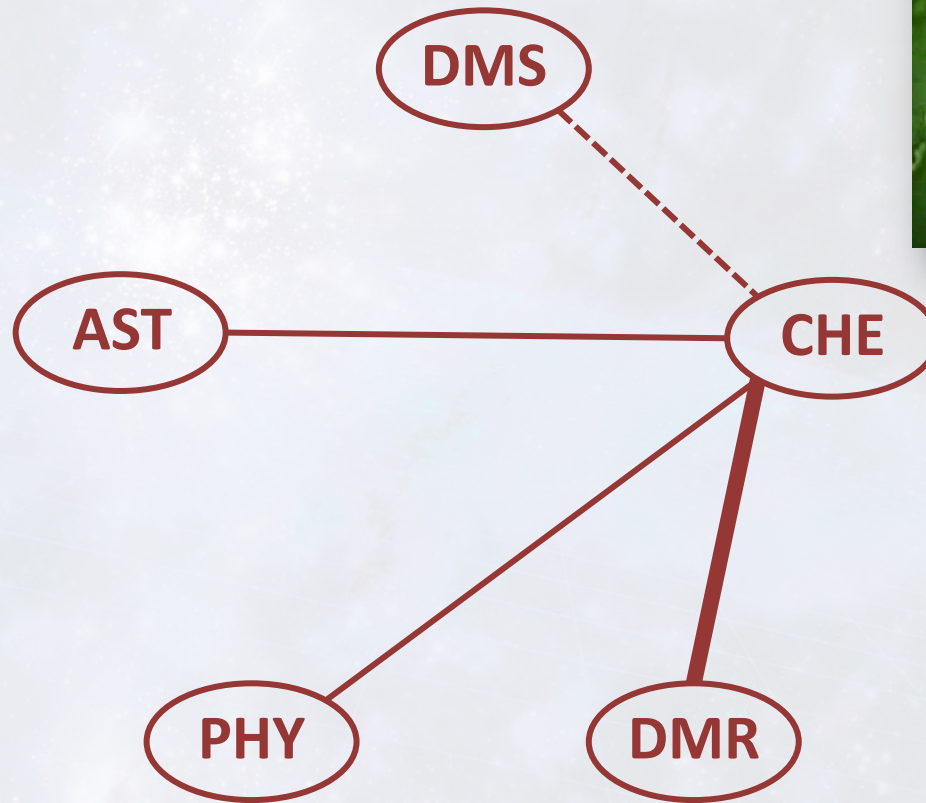
Division of Astronomical Sciences (AST)



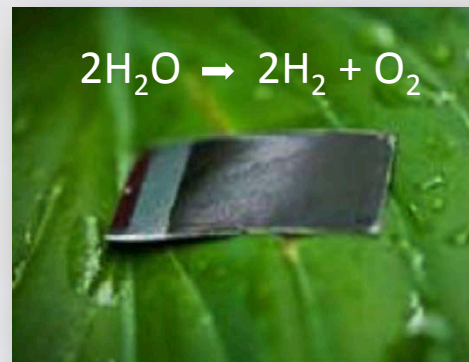
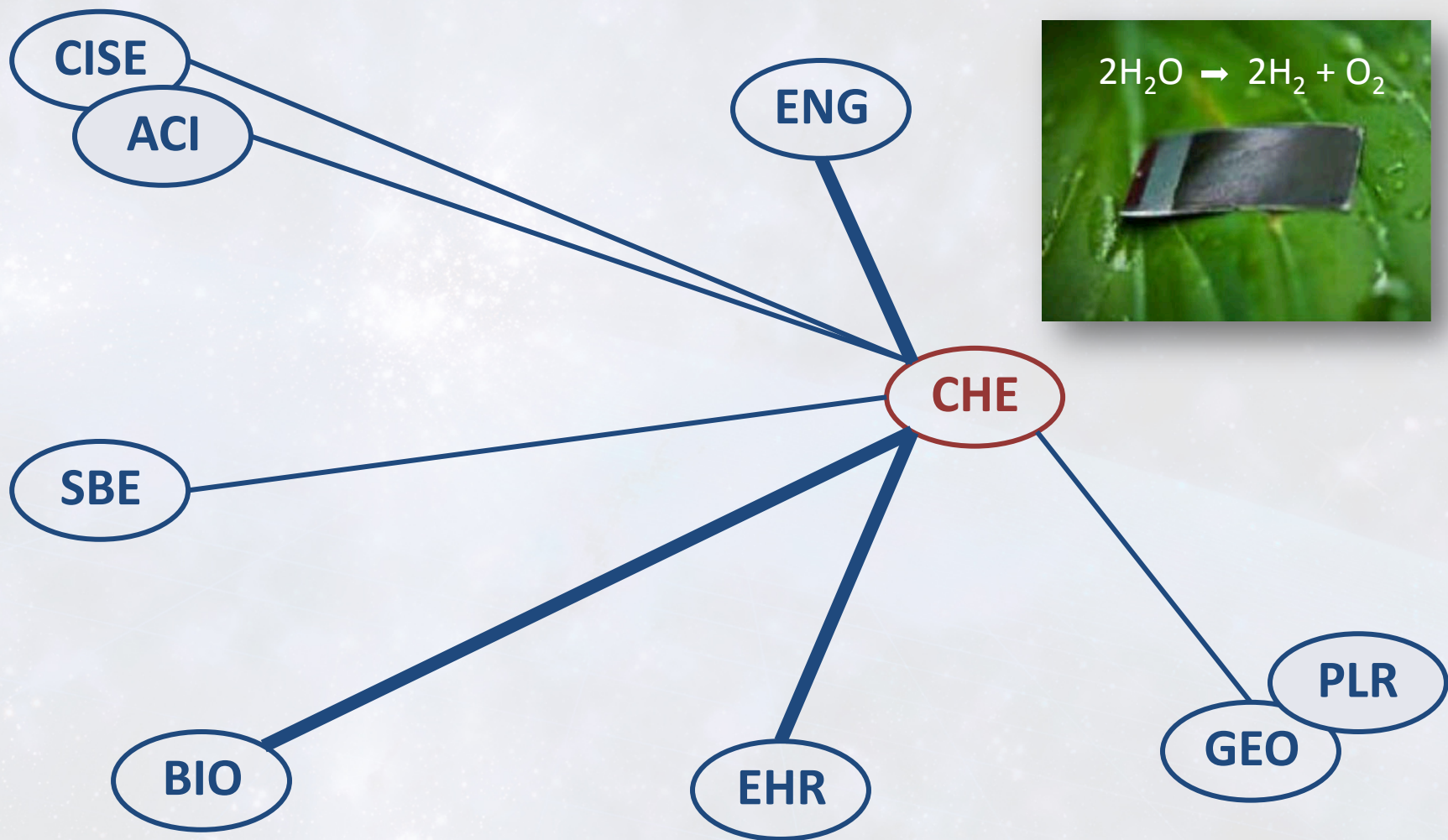
Division of Astronomical Sciences (AST)



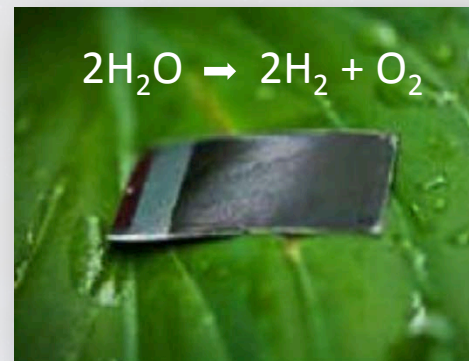
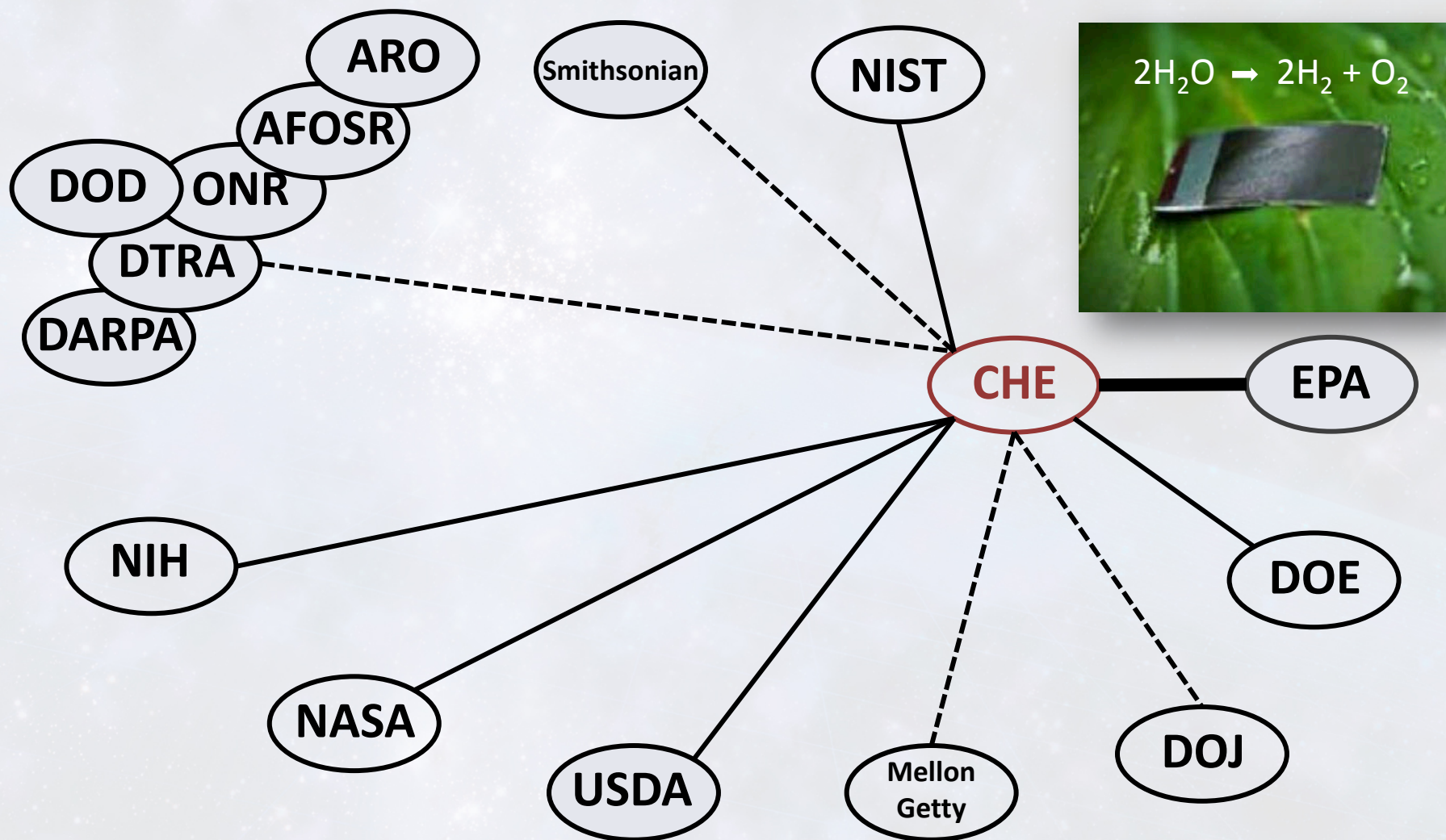
Division of Chemistry (CHE)



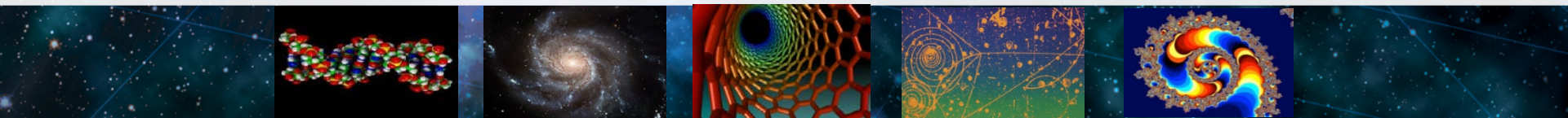
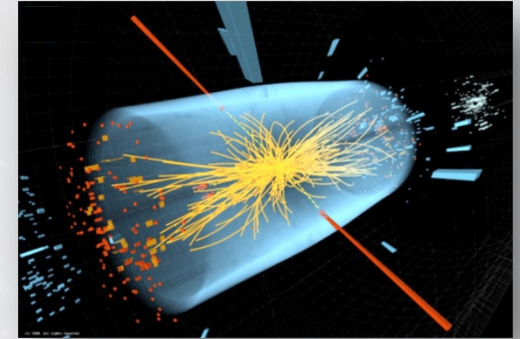
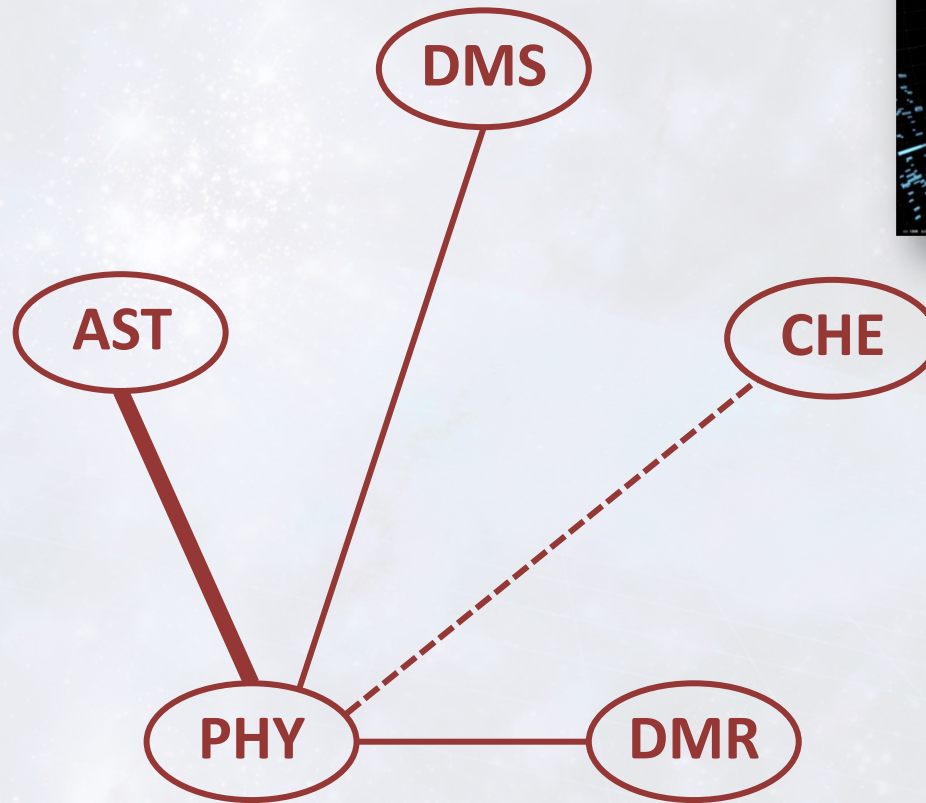
Division of Chemistry (CHE)



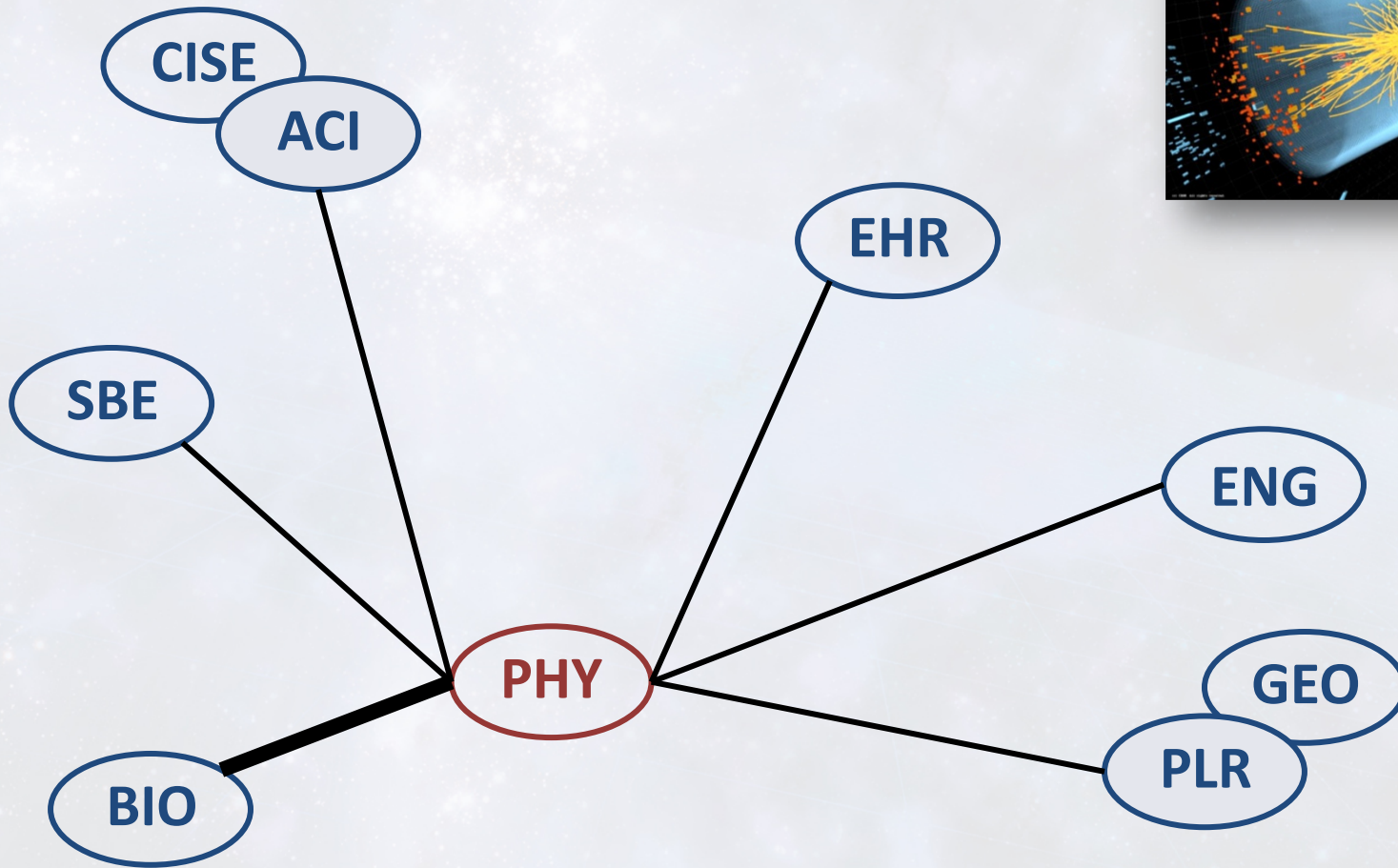
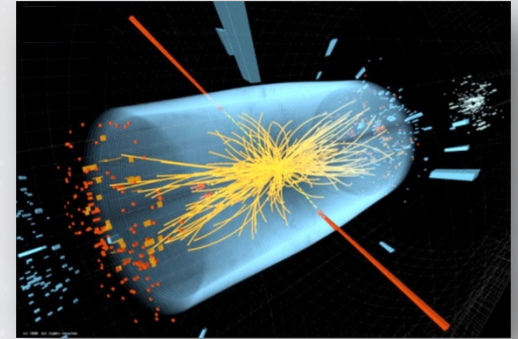
Division of Chemistry (CHE)



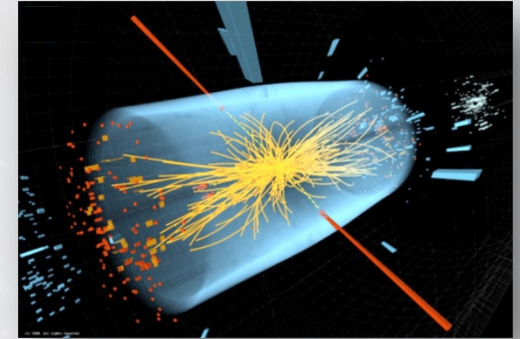
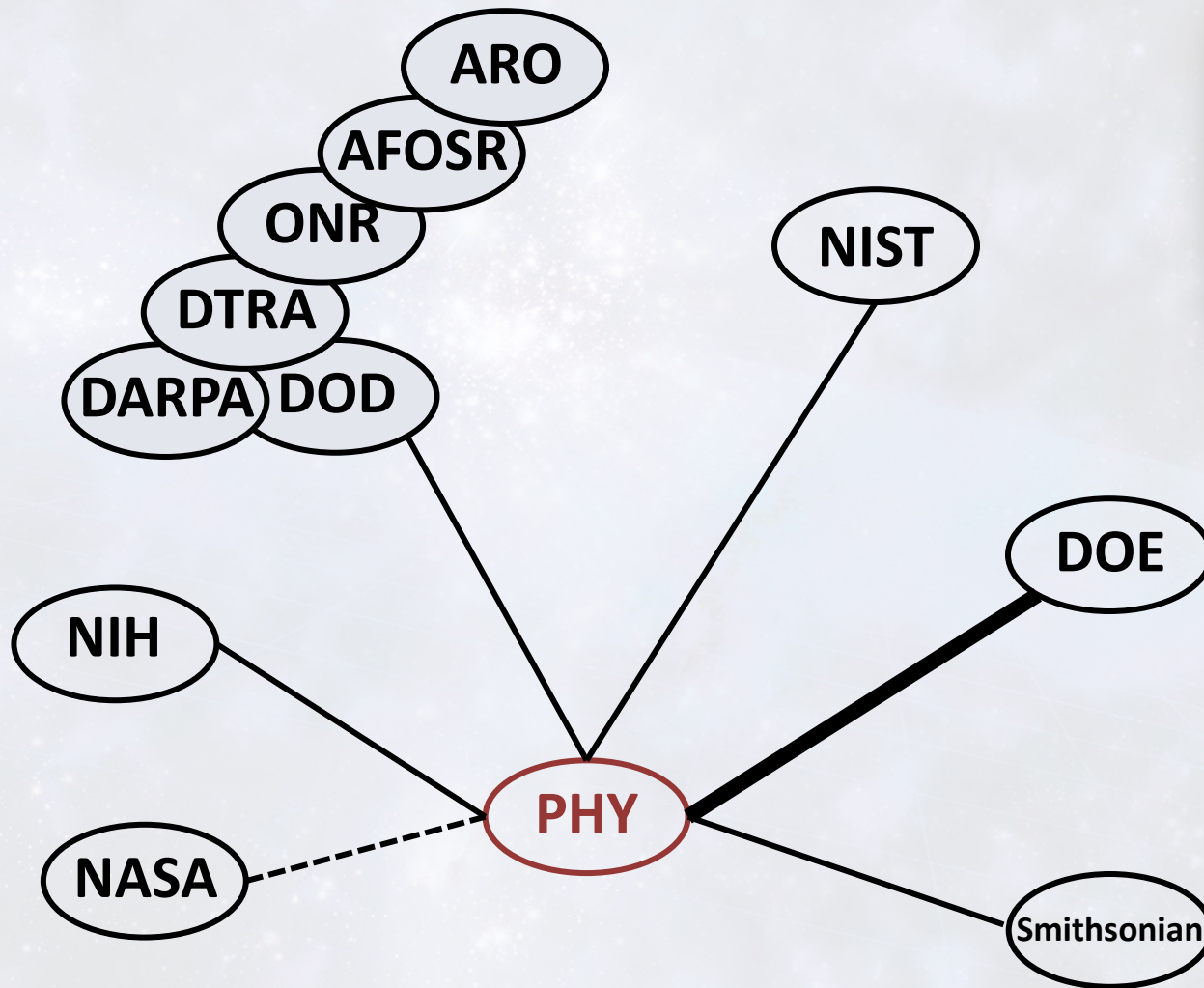
Division of Physics (PHY)



Division of Physics (PHY)



Division of Physics (PHY)



Personnel
and
Plans

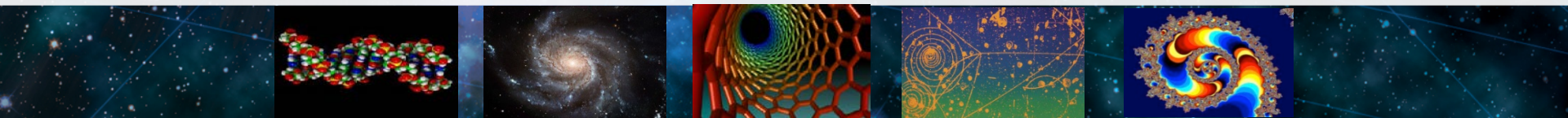
Budget

Facilities

Program
Updates

Agenda

Little New to Report



UNITED STATES
National Science Foundation

	FY 2014	FY 2015 (request)	
NSF	\$ 7172 M	\$ 7255 M	1.2%
R&RA	\$ 5808 M	\$ 5807 M	--

FY 2015

BUDGET REQUEST TO CONGRESS

UNITED STATES
National Science Foundation



FY 2015
BUDGET REQUEST TO CONGRESS

MISSION: To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

—From the National Science Foundation (NSF) Act of 1950

VISION: A Nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education.

—From Investing In Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018



UNITED STATES
National Science Foundation

	FY 2014	FY 2015 (request)	
NSF	\$ 7172 M	\$ 7255 M	1.2%
R&RA	\$ 5808 M	\$ 5807 M	--

FY 2015

BUDGET REQUEST TO CONGRESS

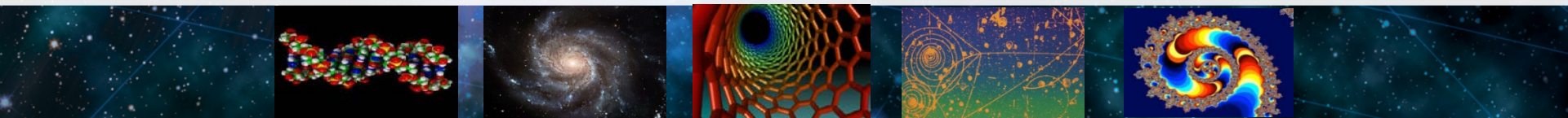
FY 2015

House Passed

NSF \$ 7400 M (3.3%)
R&RA \$ 5775 M (2.9%)
Continuing Resolution through Dec. 11, 2014
Mark
NSF \$ 7255 M (1.2%)
R&RA \$ 5839 M (0.5%)

FY 2016

OMB is considering the
NSF submission



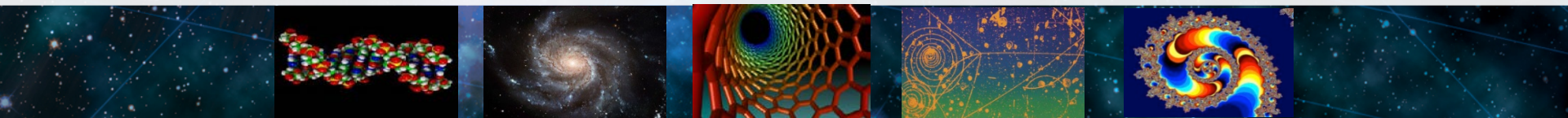
Personnel
and
Plans

Budget

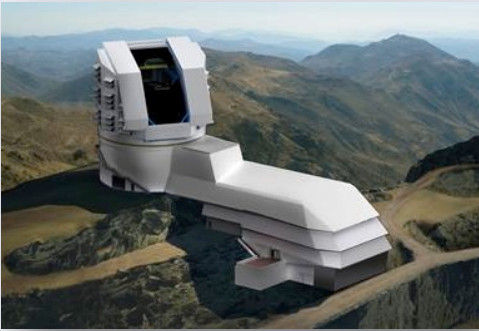
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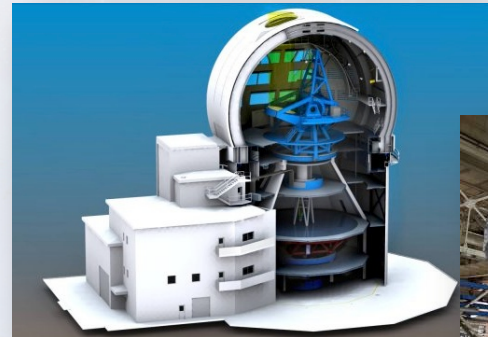


A Few Updates on Facilities



**Construction begun
Large Synoptic Survey Telescope (LSST)**

**Construction continues on the
Daniel K. Inouye Solar Telescope**



**Commissioning well underway for upgraded
Laser Interferometer Gravitational-Wave
Observatory (LIGO)**



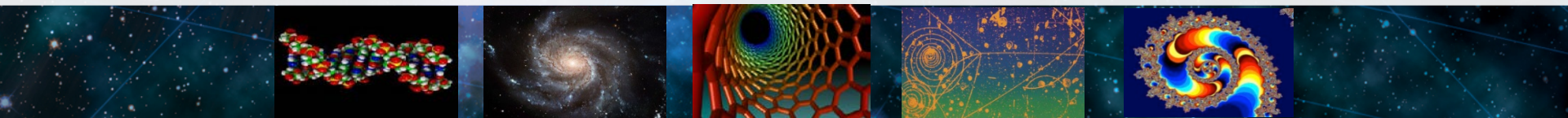
Personnel
and
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A Few Updates on Activities and Issues

Visits to MPS-Funded Institutions

Visiting to learn about breadth of individual research



Columbia and Princeton
(October)

Two to four more visits during FY 2015



Princeton

“Reproducibility of research results”

On our agenda today

Public-Private Partnerships in Science Funding

On our agenda today



A Few Updates on Activities and Issues

Public Access to Data

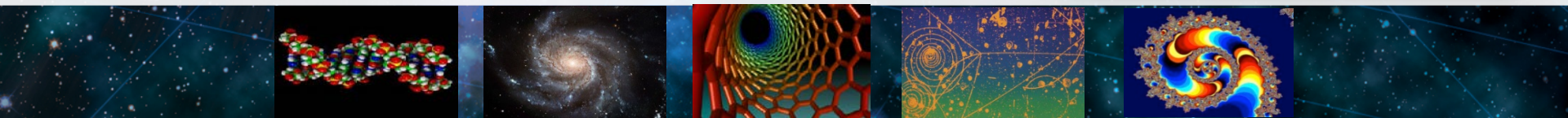
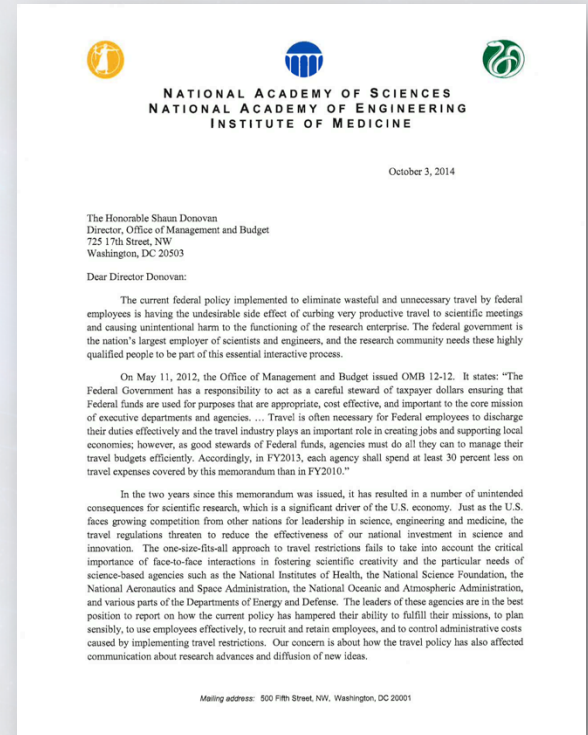
NSF plan for publications is at OSTP

Travel Limitations for Program Officers

OMB restrictions continue through FY 2015

**NSF has more than met its goals
➡ some improvement**

**Community concern including
Presidents of NAS, NAE, IOM**



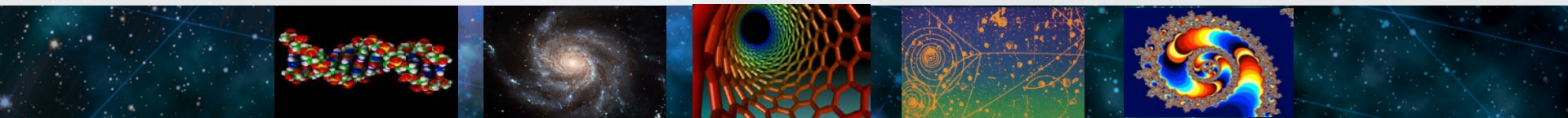
Personnel
and
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Facilities

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Agenda





Today (Monday)

State of the Directorate ✓

Interim Report “P5” Subcommittee 45

Young-Kee Kim

Data reproducibility, reliability, robustness 30

Fleming Crim

Report Responses and Discussion

Optics and Photonics 20

Clark Cooper

Food Systems 20

Steve Bernasek





Today (Monday)

Public – Private Partnerships 20

Jennifer Pearl

AST Divestments and New Partnerships 20

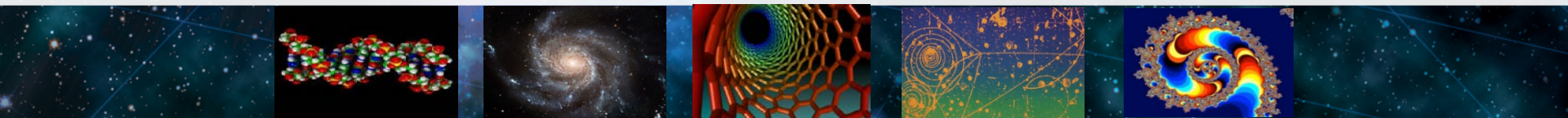
Pat Knezek

Mathematical Sciences Innovation Incubator 20

Michael Vogelius

Preparation for Director's Visit 25

Juan DePablo





Tomorrow (Tuesday)

Report Response and Discussion

Materials Instrumentation 20

Mary Galvin

Midscale Programs 40

Pat Knezek, Denise Caldwell

Future Directions in Advanced Computing Infrastructure 60

Emily Carter, Juan Meza, Irene Qualters

Director's Perspective 60

France Córdoba

