

Welcome to Astronomy 150!

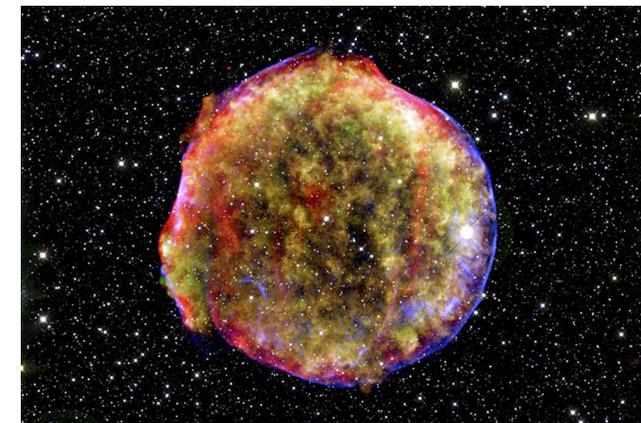
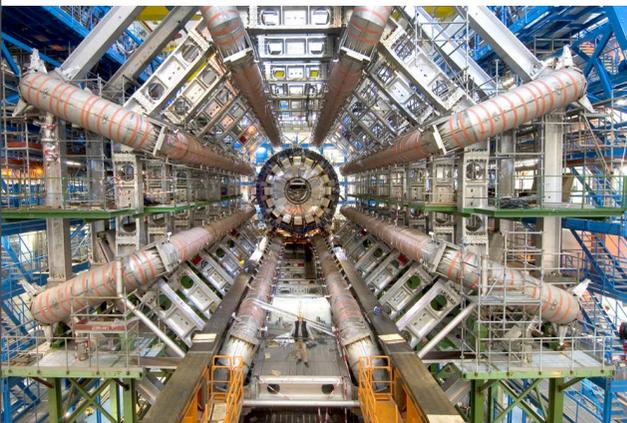
Pick up a Syllabus
also available online

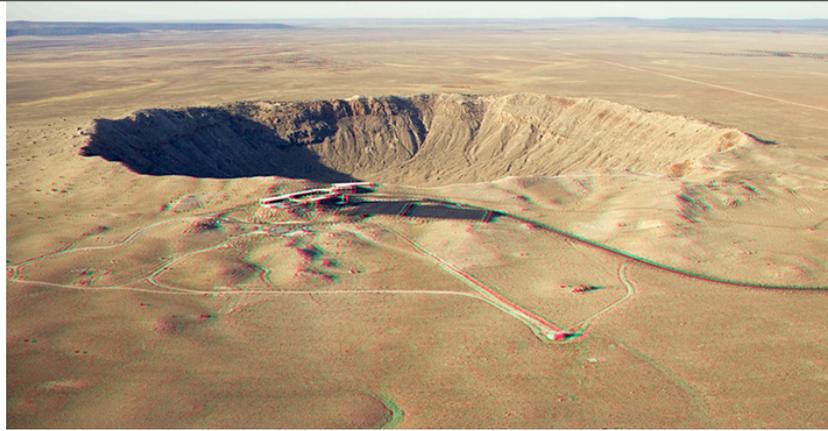
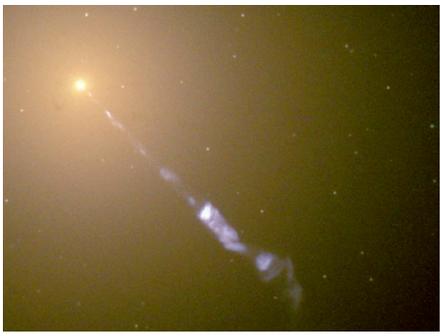
Today

Introductions

Preview

Business: Course Syllabus





Welcome to Astronomy 150!

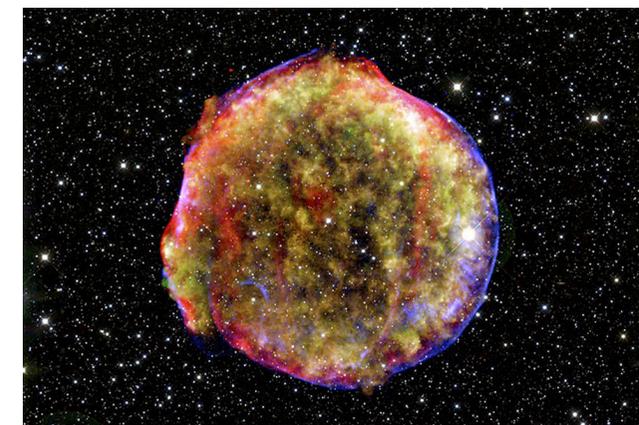
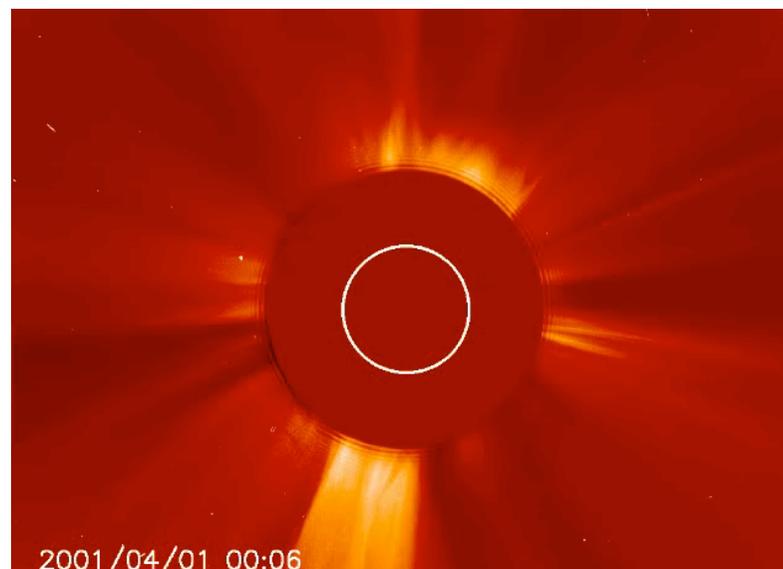
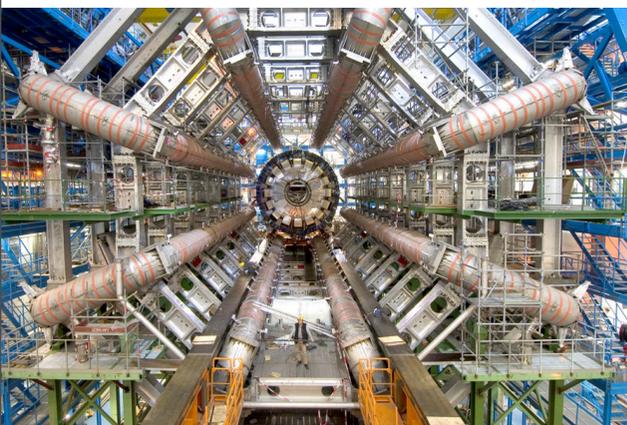
Pick up a Syllabus
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Today

Introductions

Preview

Business: Course Syllabus



2001/04/01 00:06

Welcome to Astronomy 150!



Wednesday, January 18, 2012

Welcome to Astronomy 150!

KILLER SKIES

TON DAVIS
3-27-11

Introductions: Getting to Know Me

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Instructor: Prof. Brian Fields

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Office Hours:

- ▶ W 2-3pm, around the corner in Wohlers 147
- ▶ or by appointment (send email to arrange)

Introductions: Getting to Know Me

Instructor: Prof. Brian Fields

Office Hours:

- ▶ W 2-3pm, around the corner in Wohlers 147
- ▶ or by appointment (send email to arrange)

Office: 216 Astronomy Building

Email: bdfields@illinois.edu

Phone: 333-5529

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- ▶ or by appointment (send email to arrange)

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Email: bdfields@illinois.edu

Phone: 333-5529

My life's story

Introductions: Getting to Know You

Introductions: Getting to Know You

Stand up

Introductions: Getting to Know You

Stand up

Seriously, stand up!
I'm not kidding!

Introductions: Getting to Know You

Stand up

Repeat, filling in the blanks

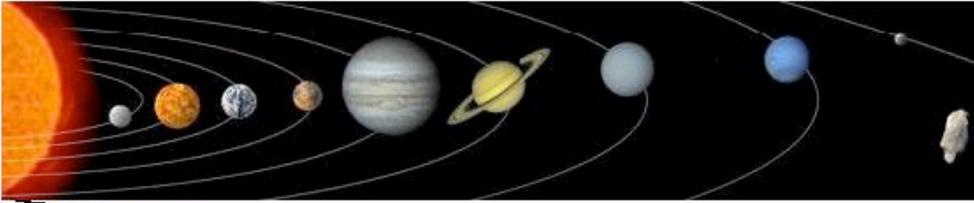
Hello! My name is _____. I am
from _____. I am majoring in
_____. I am glad meet you!

Seriously, stand up!
I'm not kidding!



Preview

The Big Picture

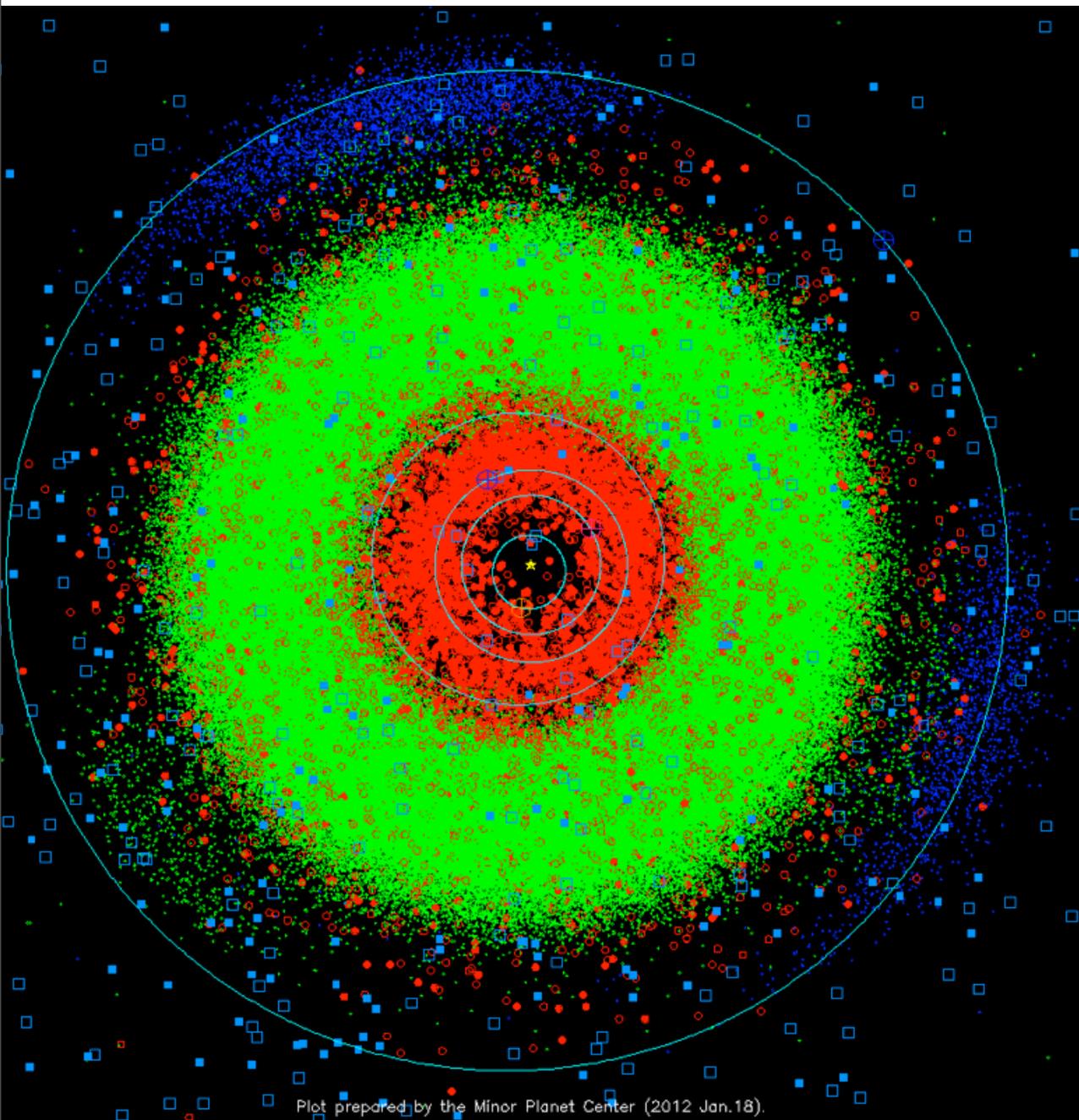


The cosmos is highly organized!

Gravity binds small systems together; these systems are bound into larger systems, and so on.

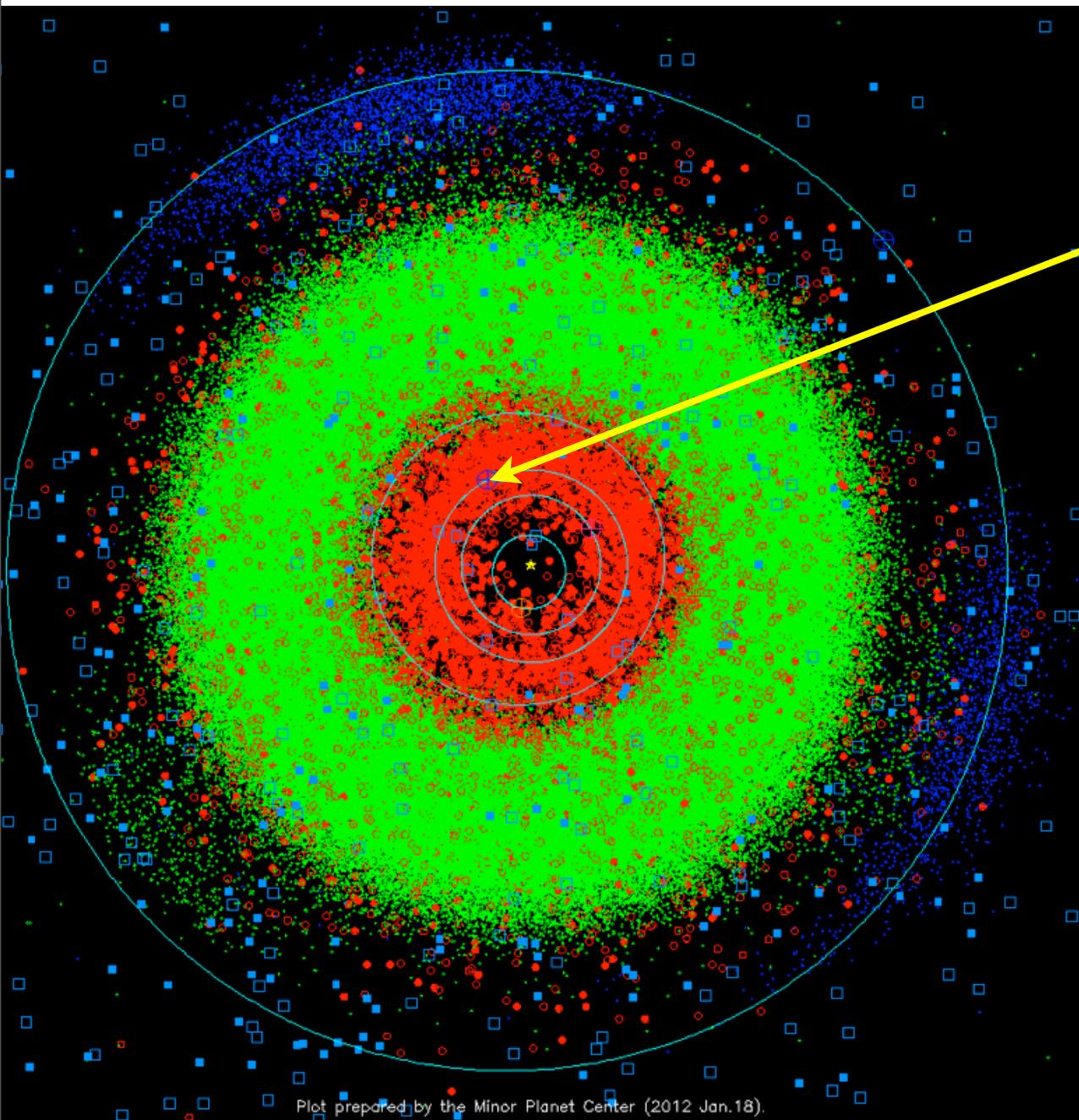
...and danger lurks at all levels!

Solar System: Impacts



Plot prepared by the Minor Planet Center (2012 Jan. 18).

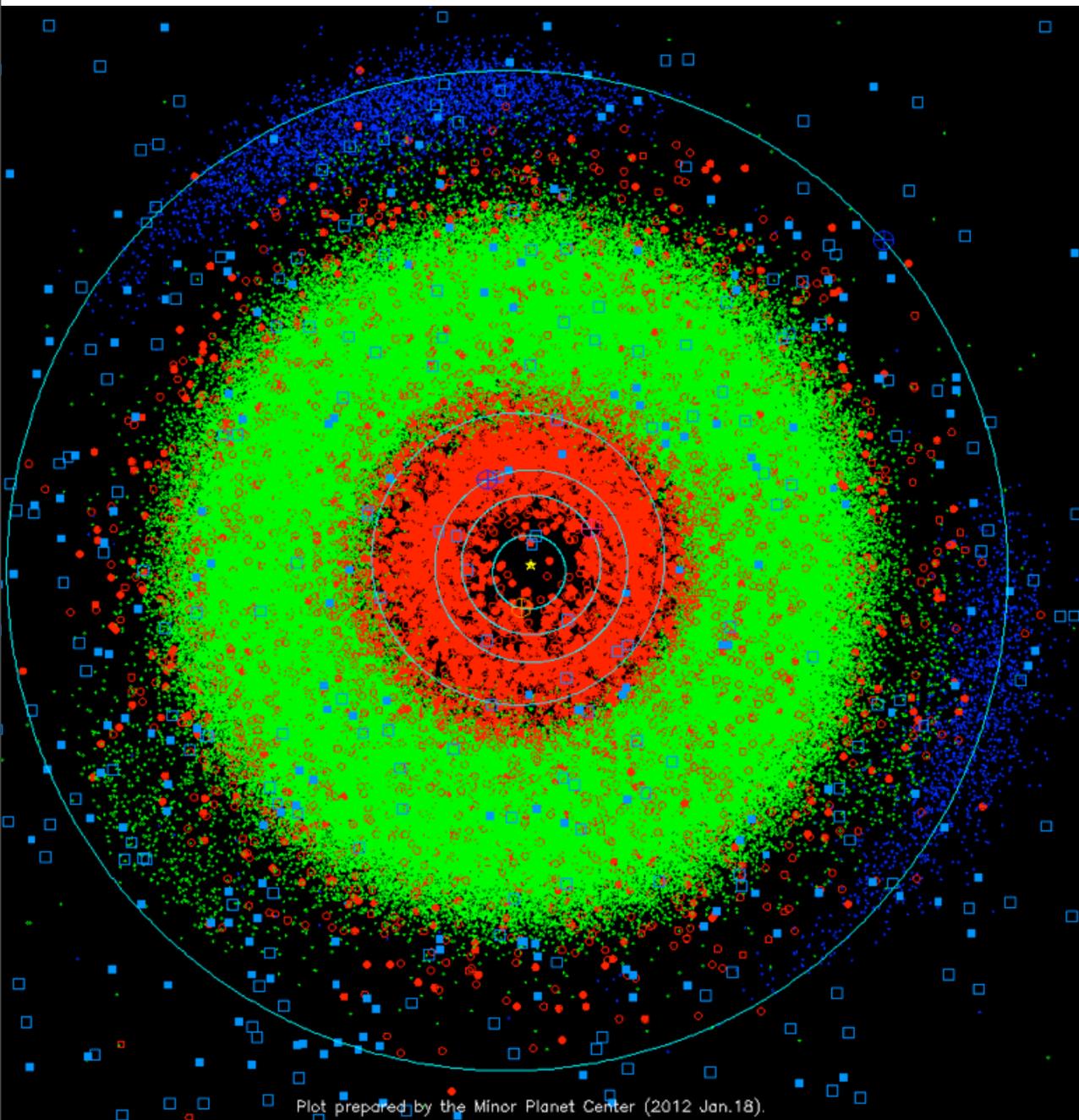
Solar System: Impacts



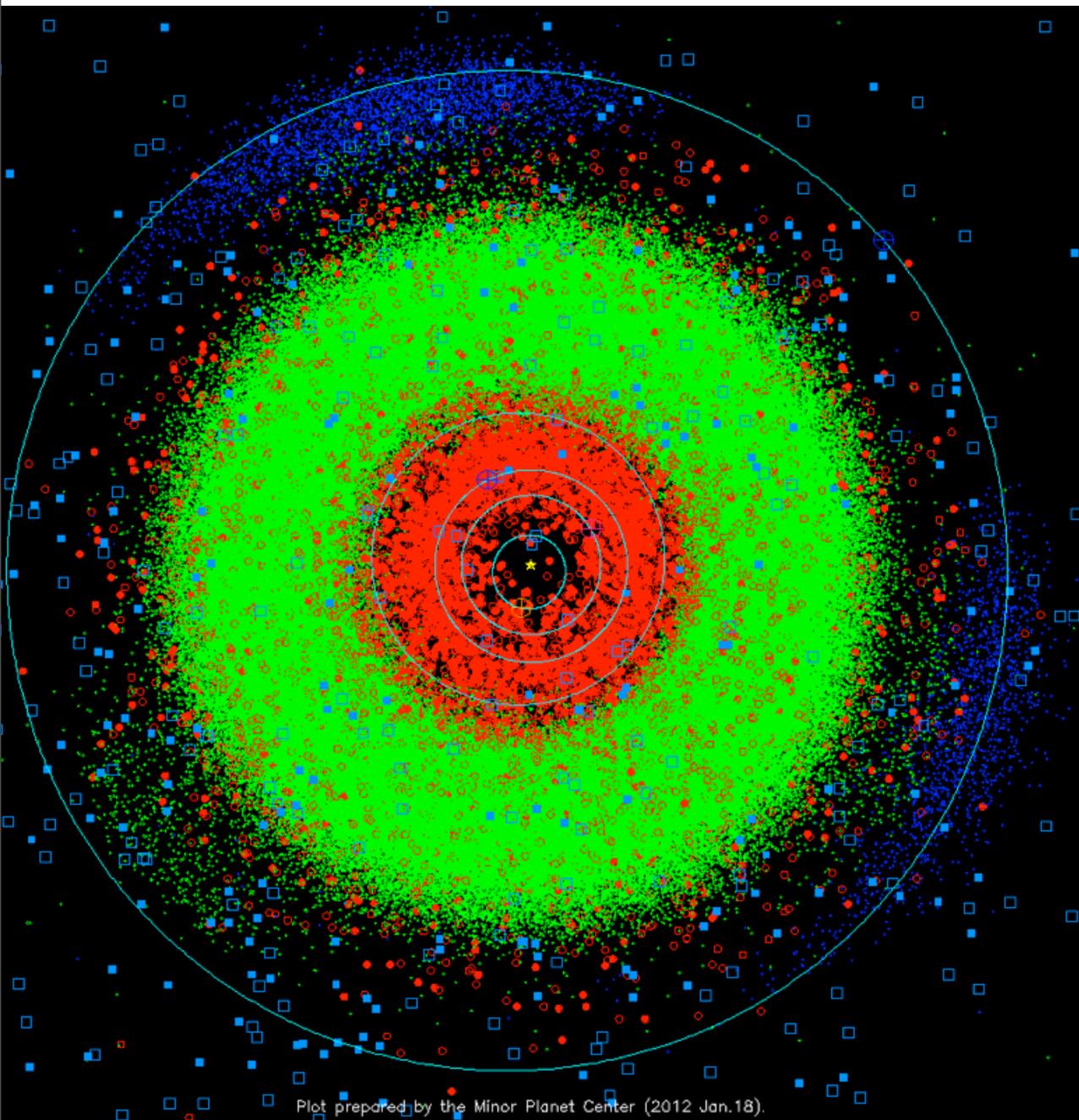
You are here

Plot prepared by the Minor Planet Center (2012 Jan.18).

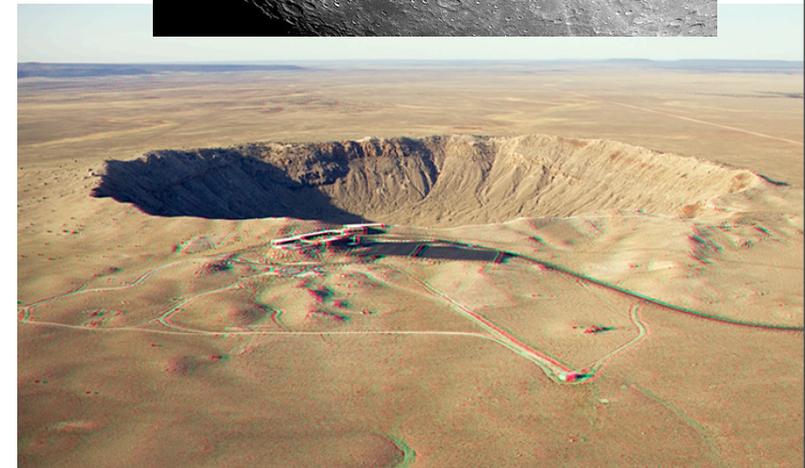
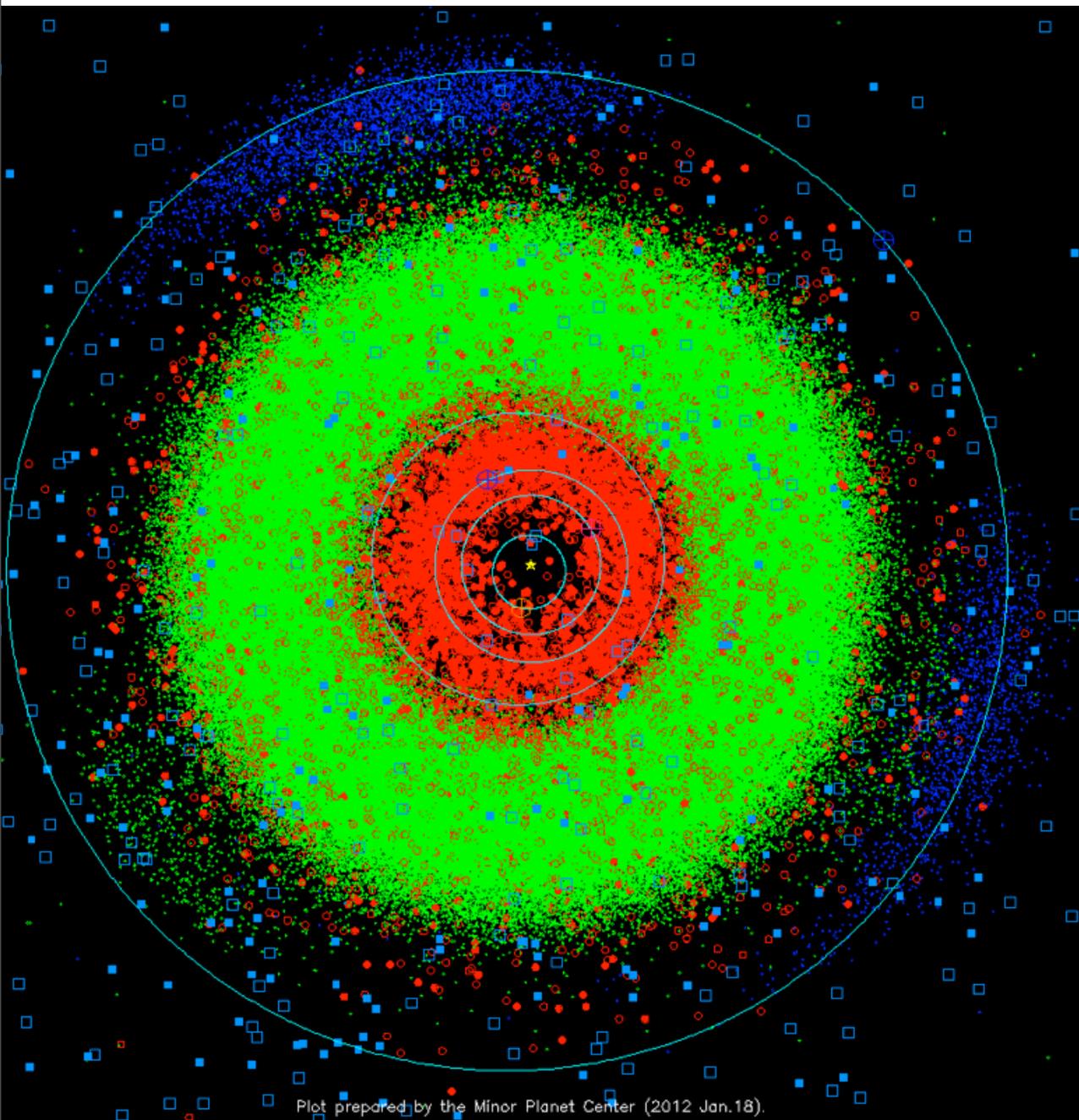
Solar System: Impacts



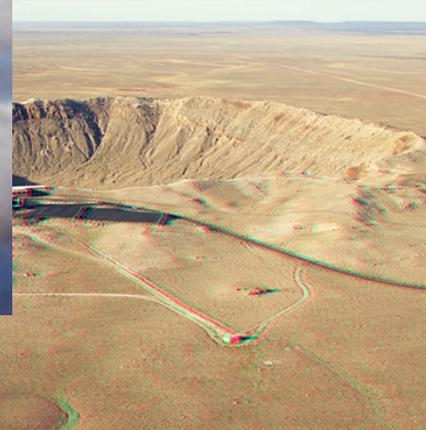
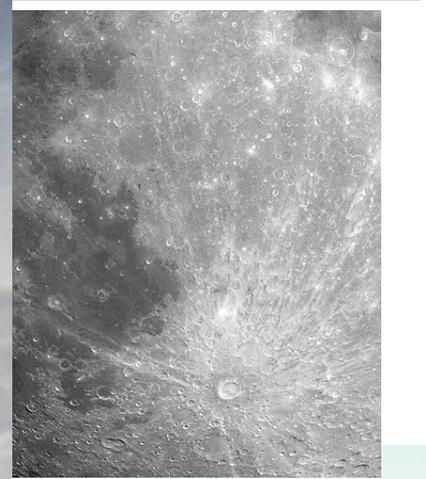
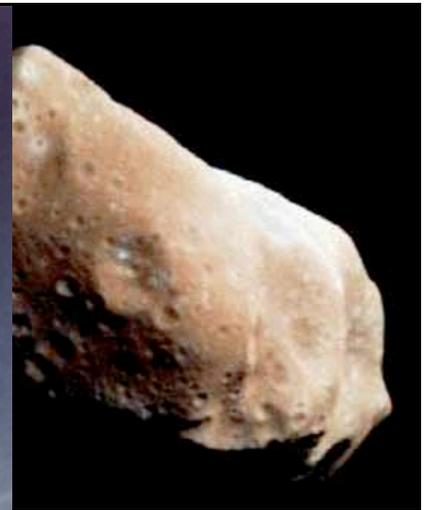
Solar System: Impacts



Solar System: Impacts



Solar System: Impacts



Plot prepared by the Minor Planet Center (2012 Jun 14).

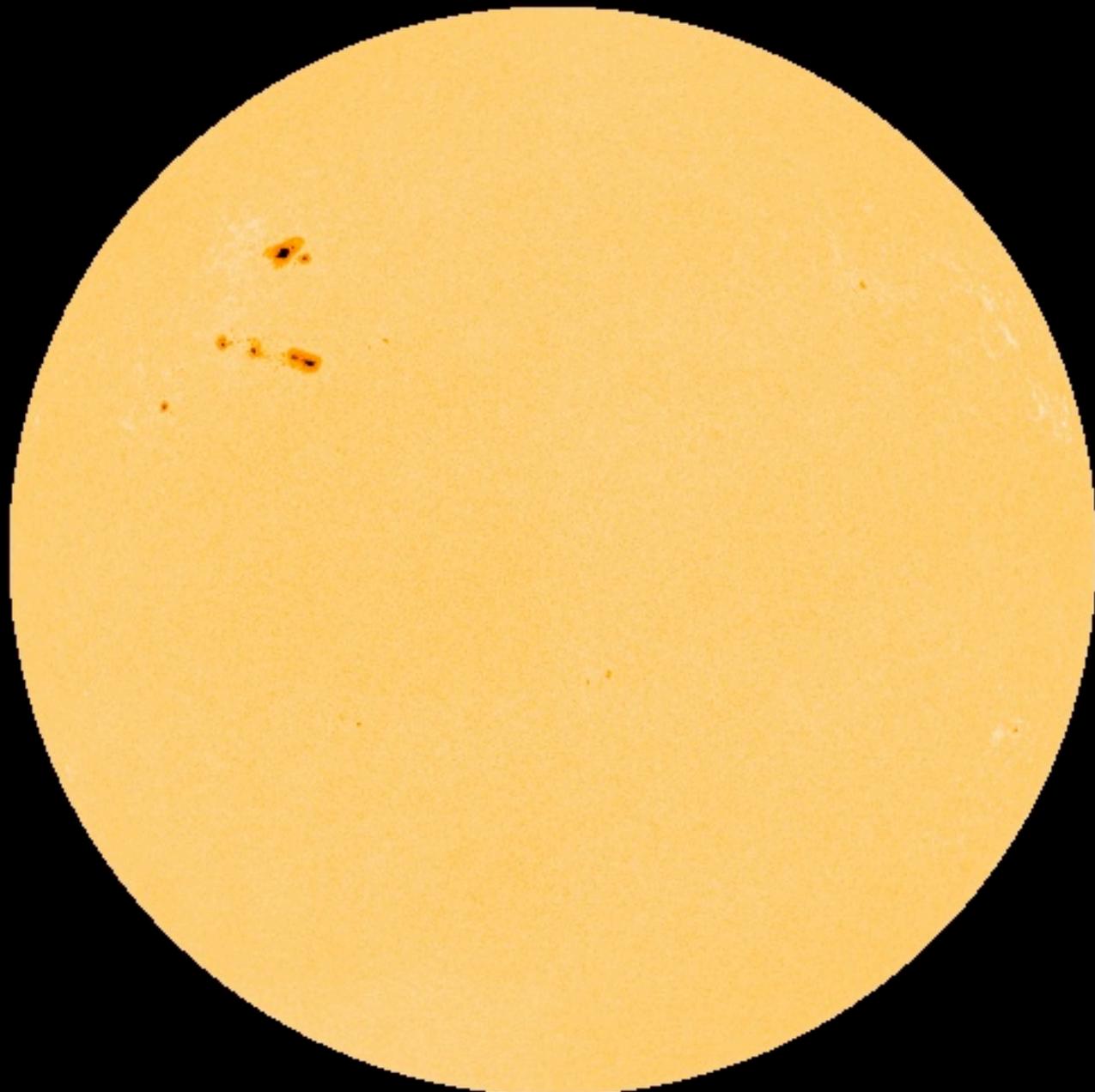
Solar System: Impacts



Plot prepared by the Minor Planet Center (2012 Jun 14).

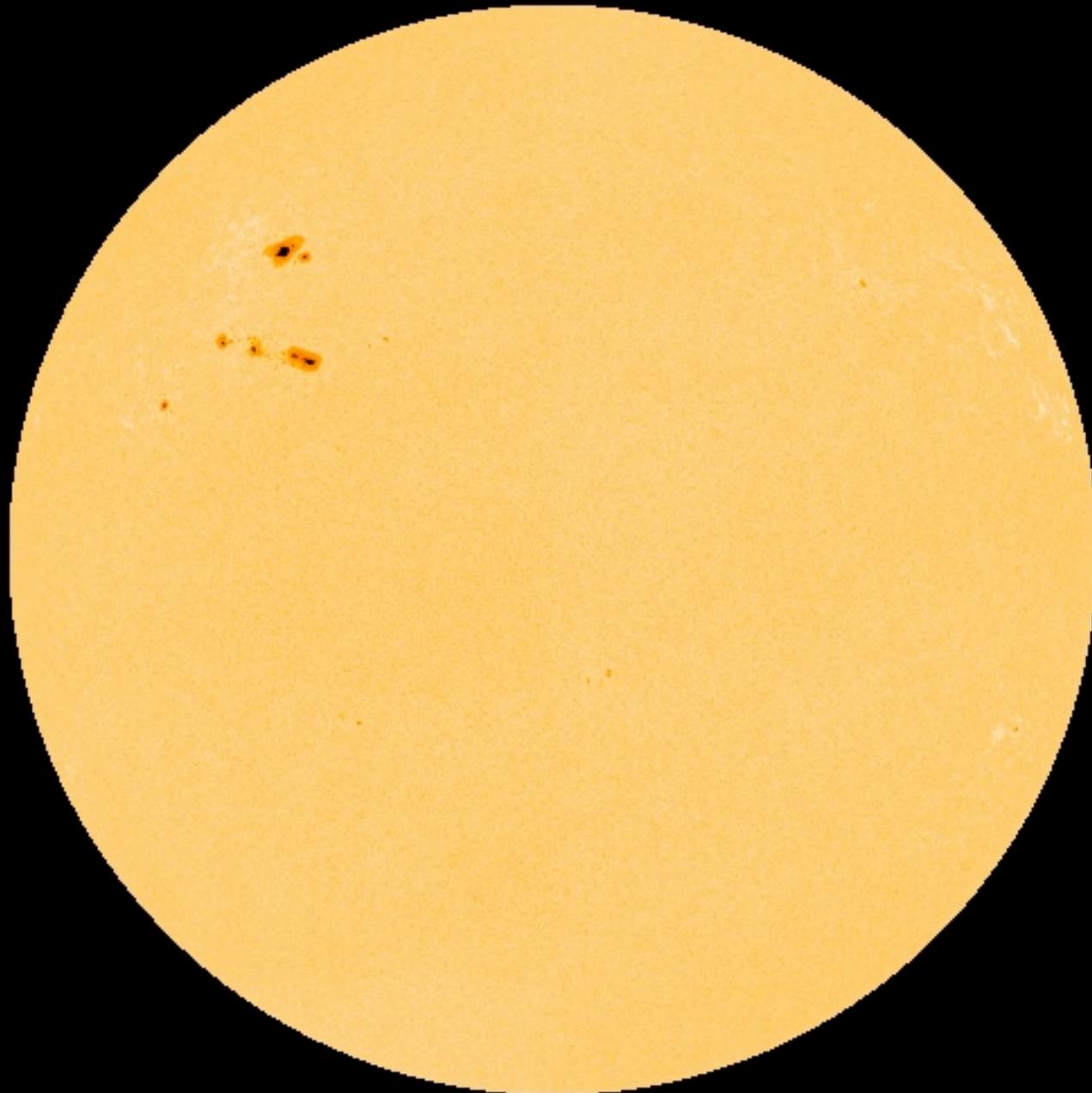
Uh oh.

The Sun: Radiation Storms

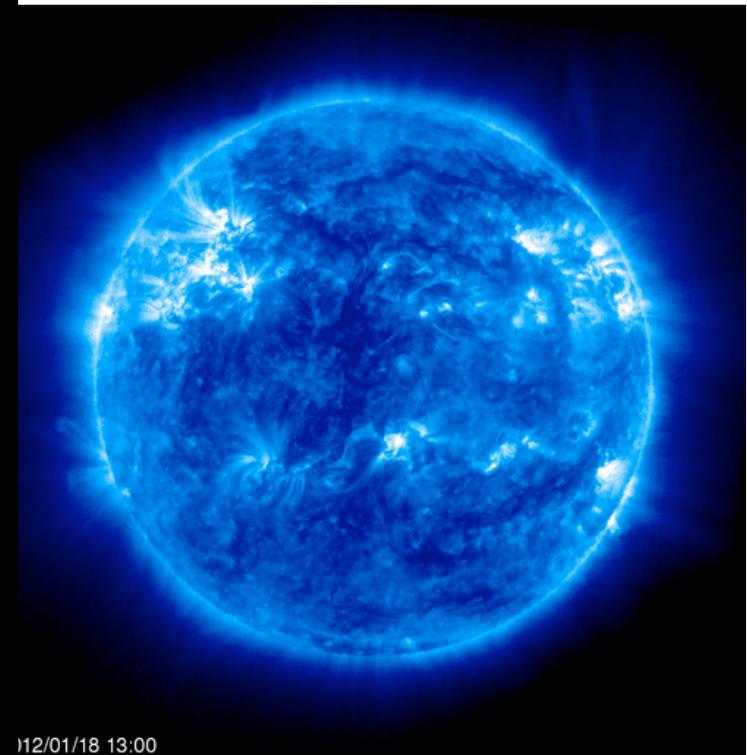


SDO/HMI Quick-Look Continuum 20120118_133000

The Sun: Radiation Storms

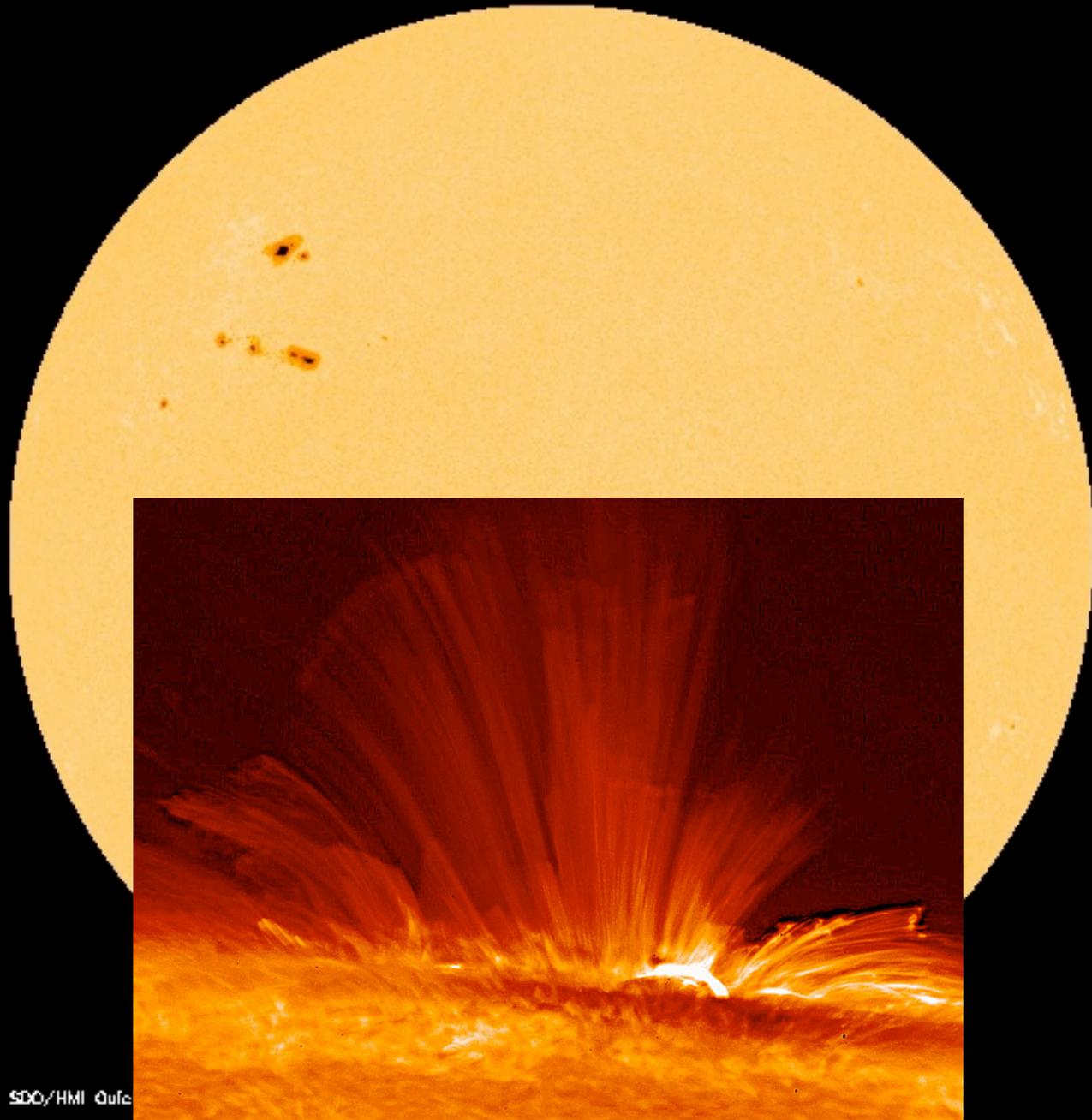


SDO/HMI Quick-Look Continuum 20120118_133000

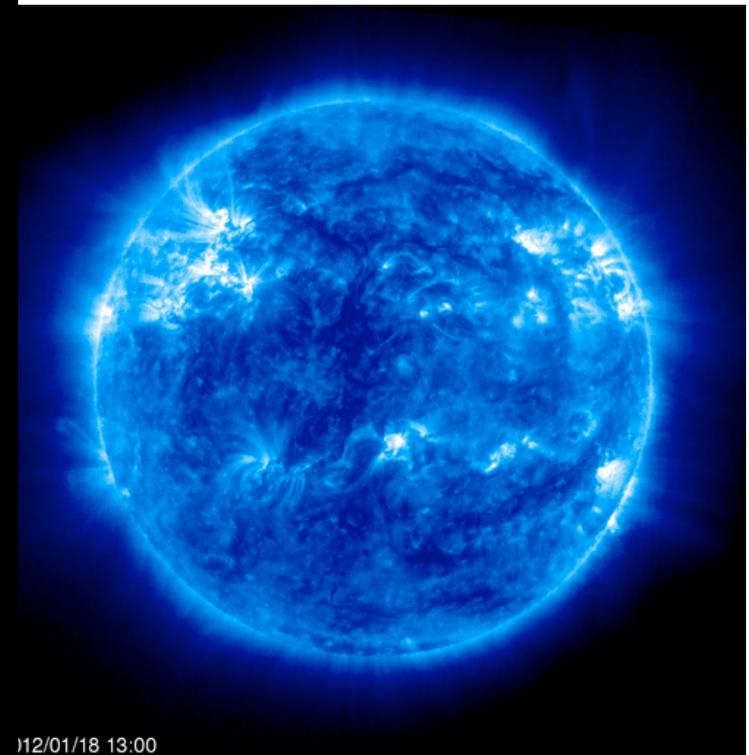


2012/01/18 13:00

The Sun: Radiation Storms

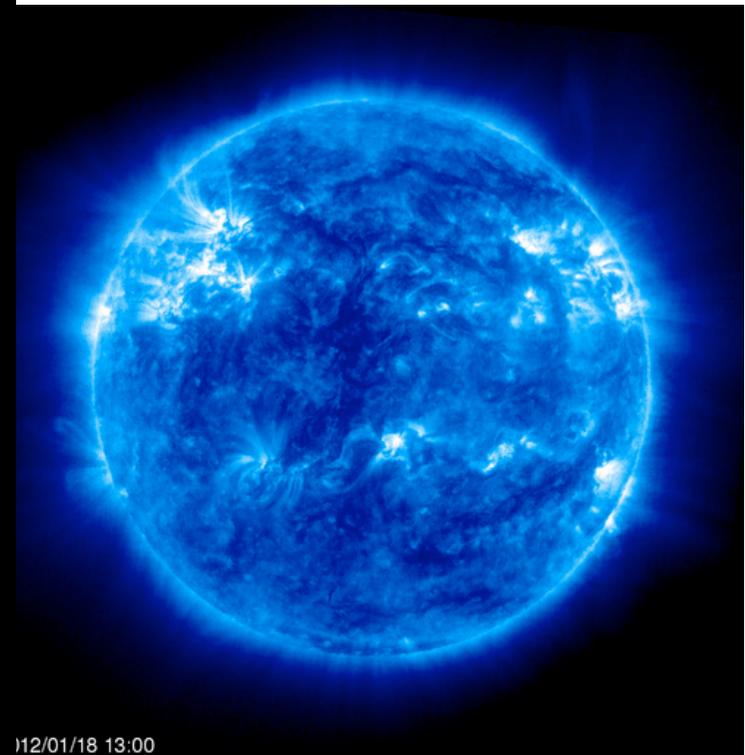
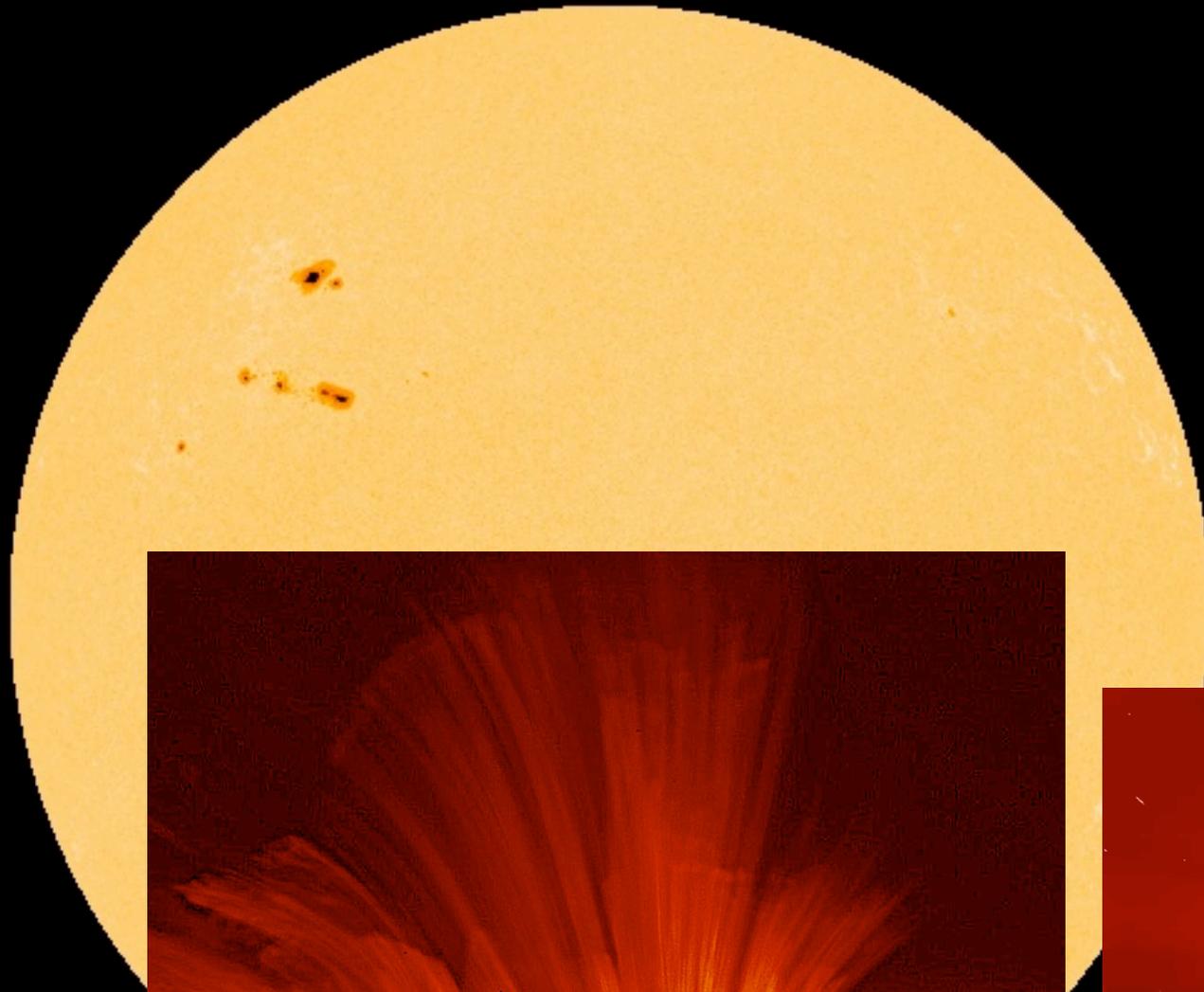


SDO/HMI Quia

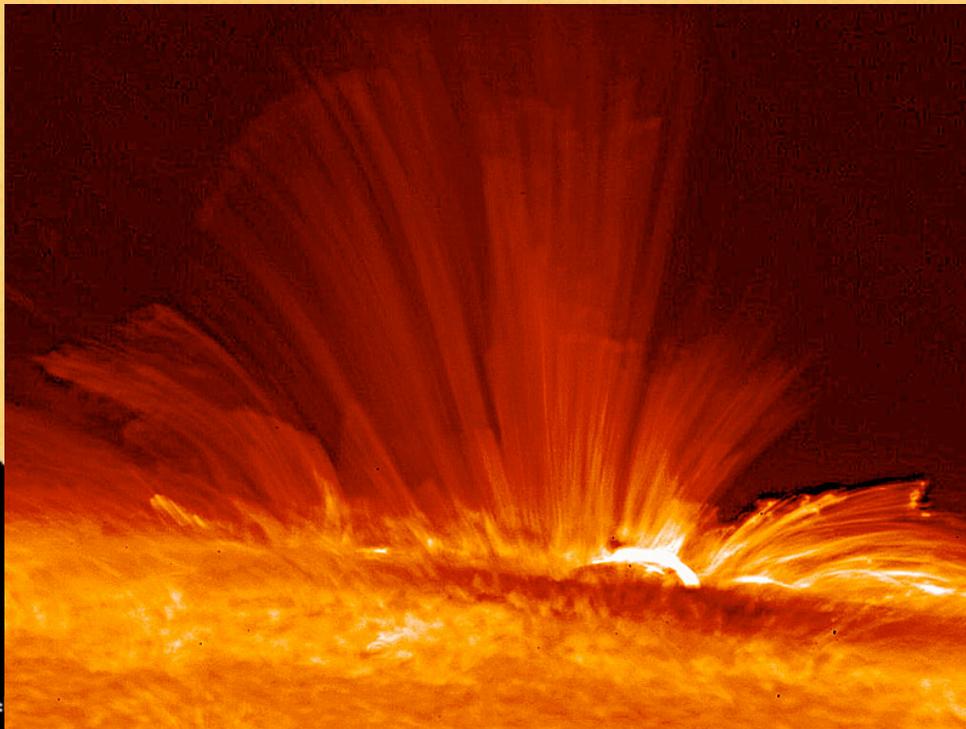


12/01/18 13:00

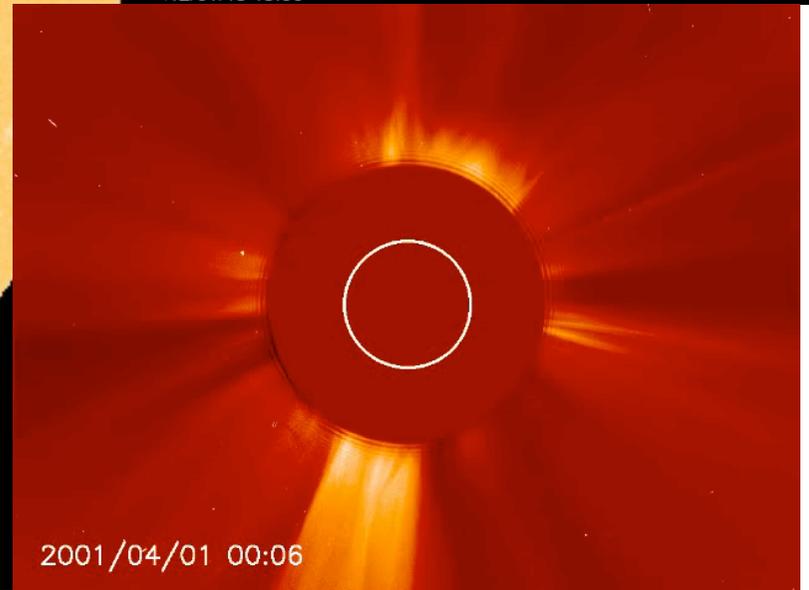
The Sun: Radiation Storms



11/21/18 13:00

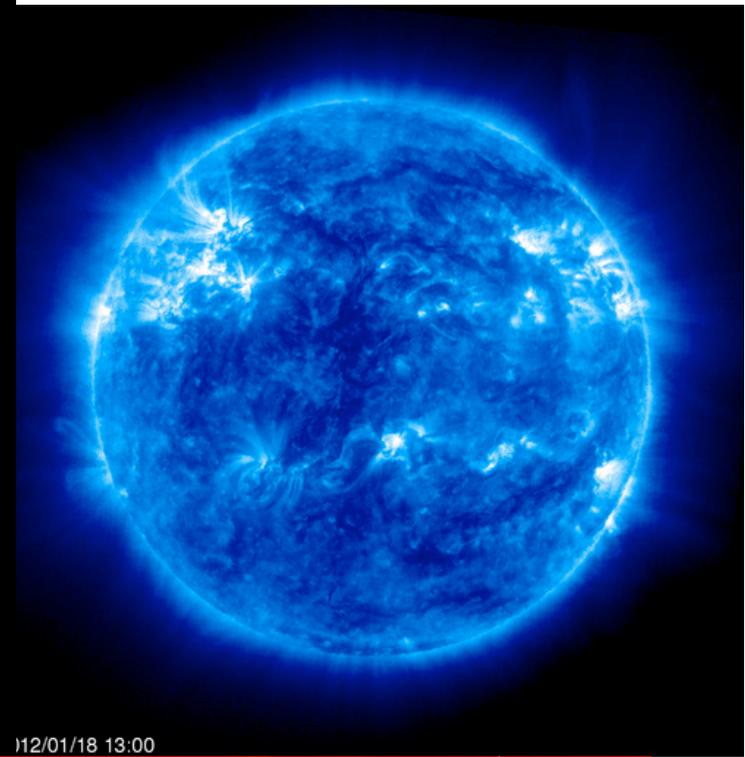
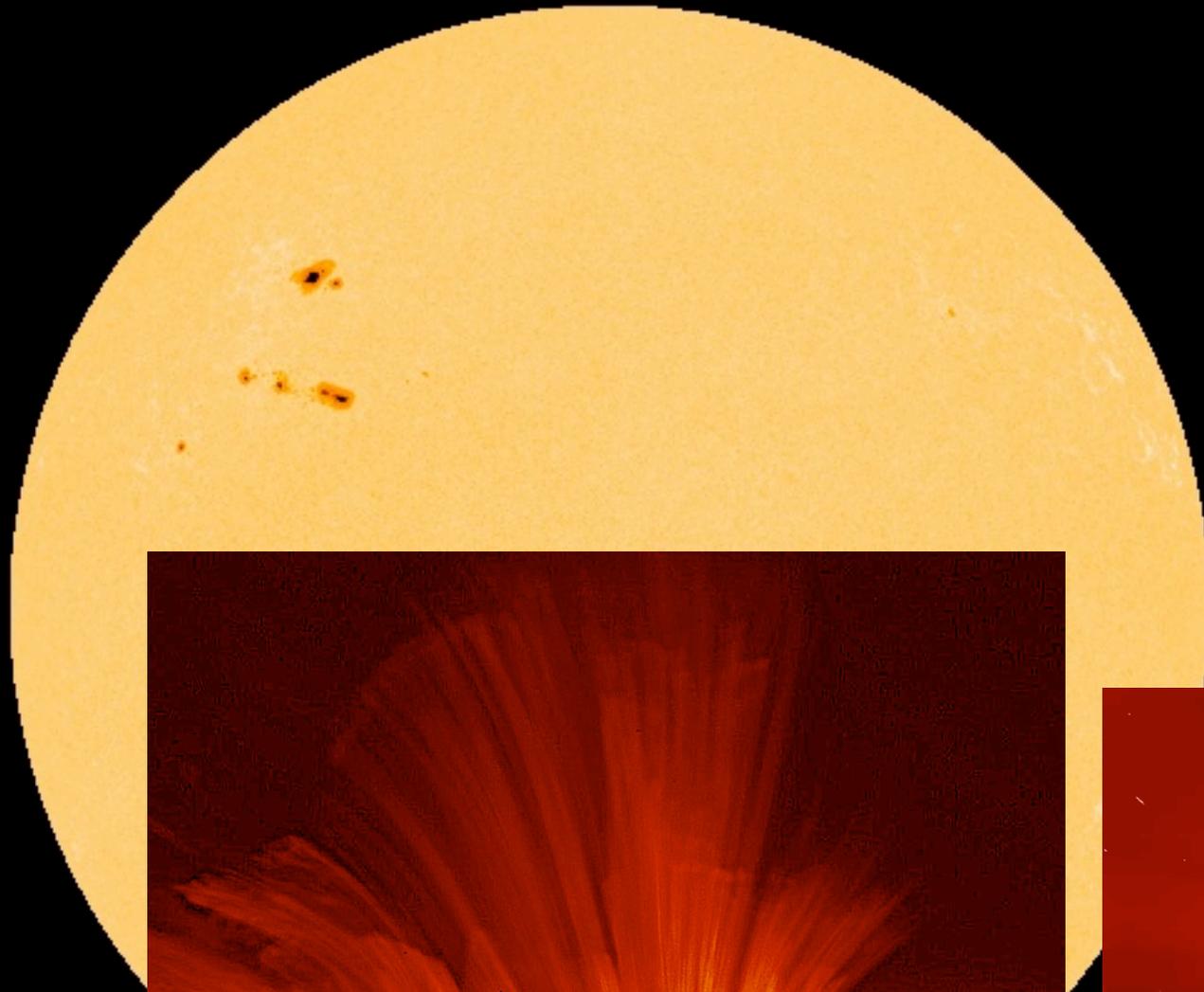


SDO/HMI Quia

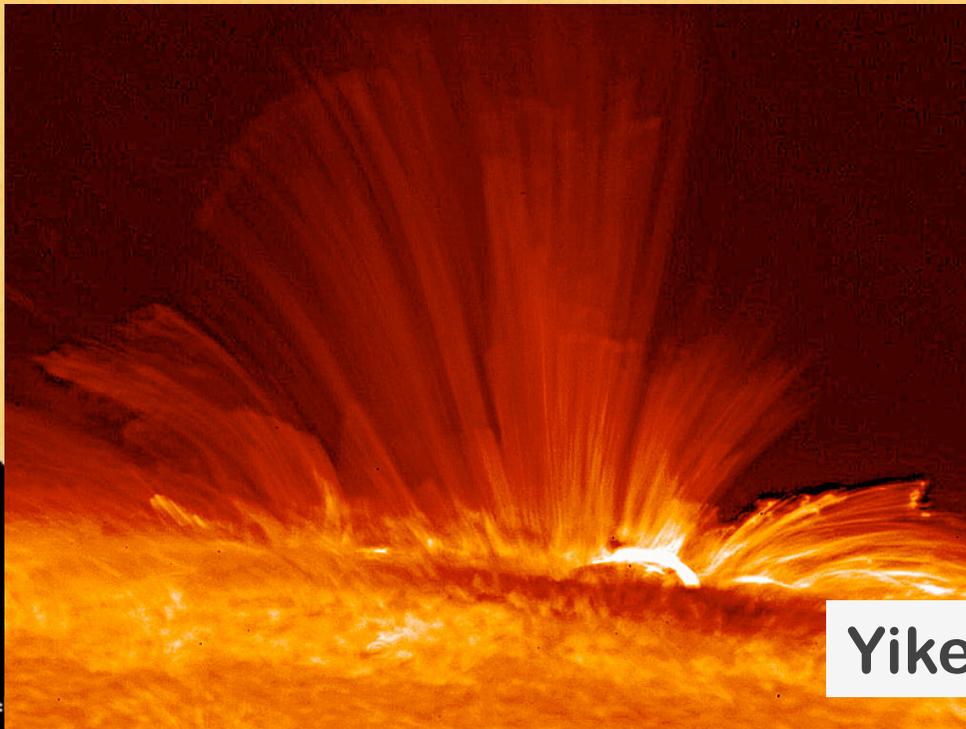


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The Sun: Radiation Storms

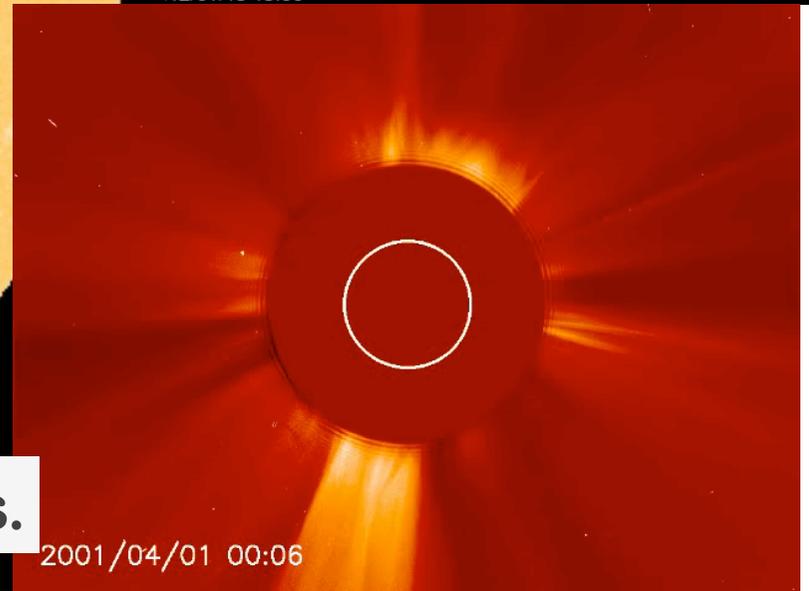


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SDO/HMI Quia

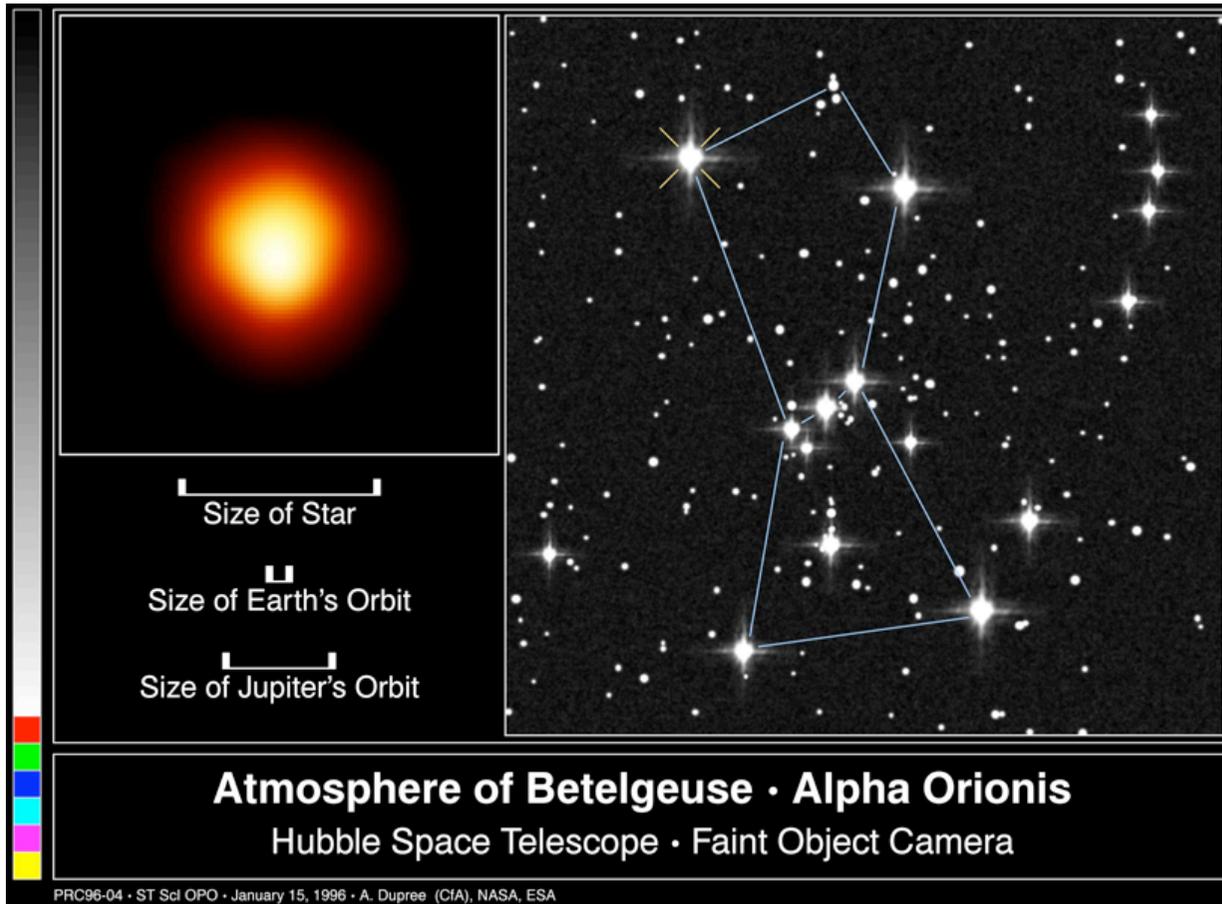
Yikes.



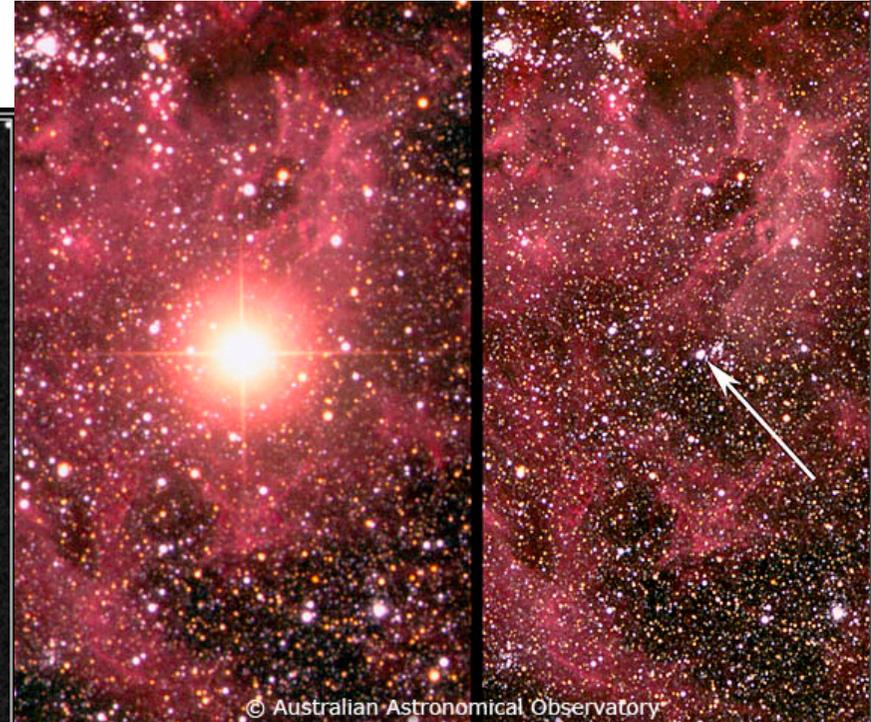
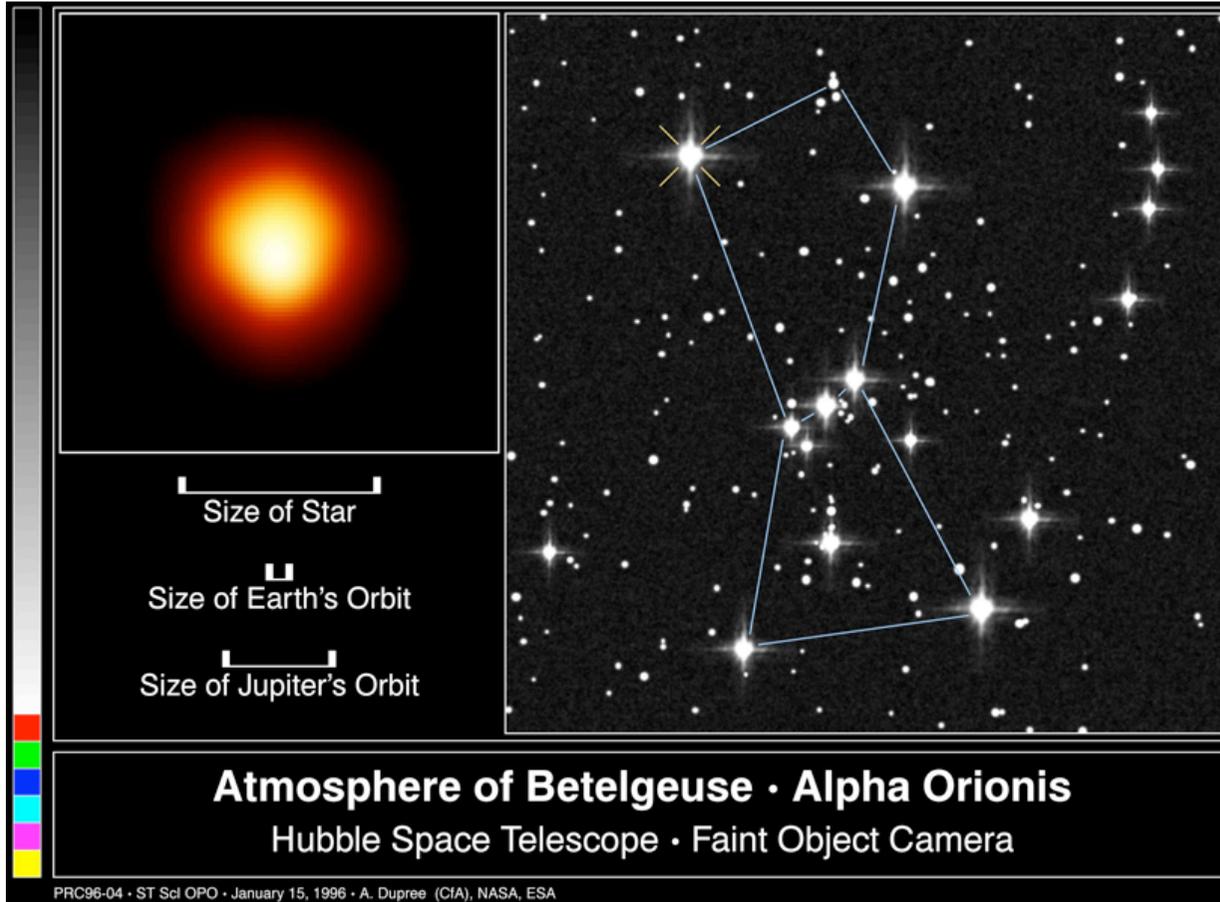
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Other Stars:

Supernova Explosions as Cosmic WMD

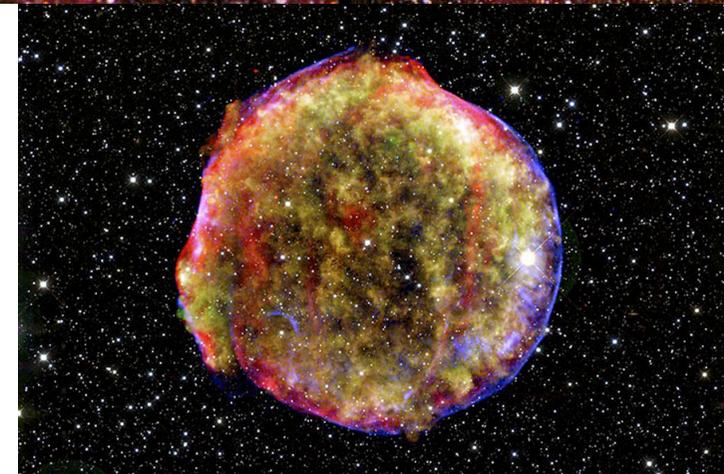
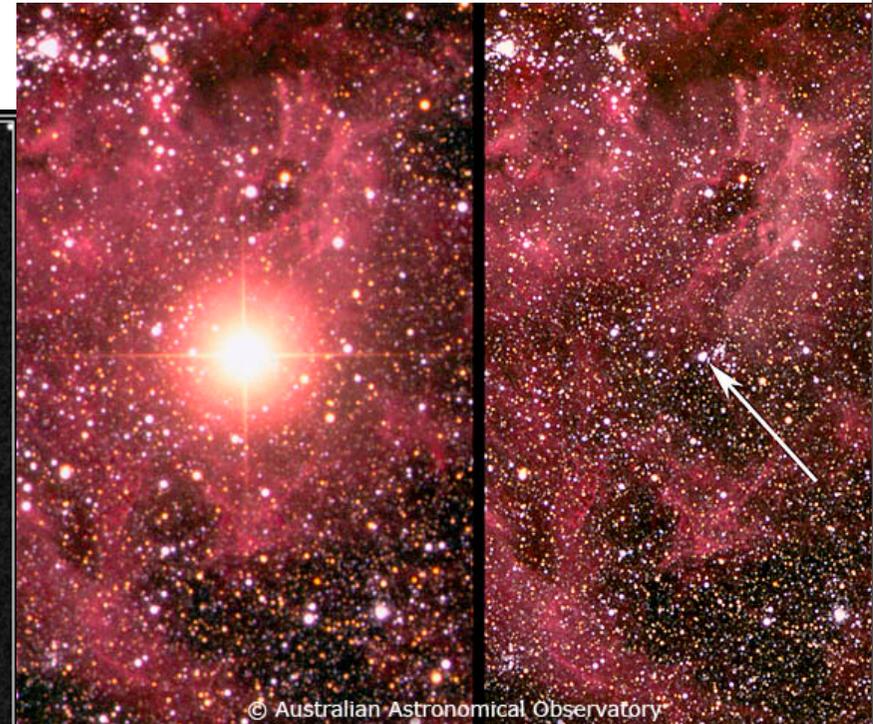
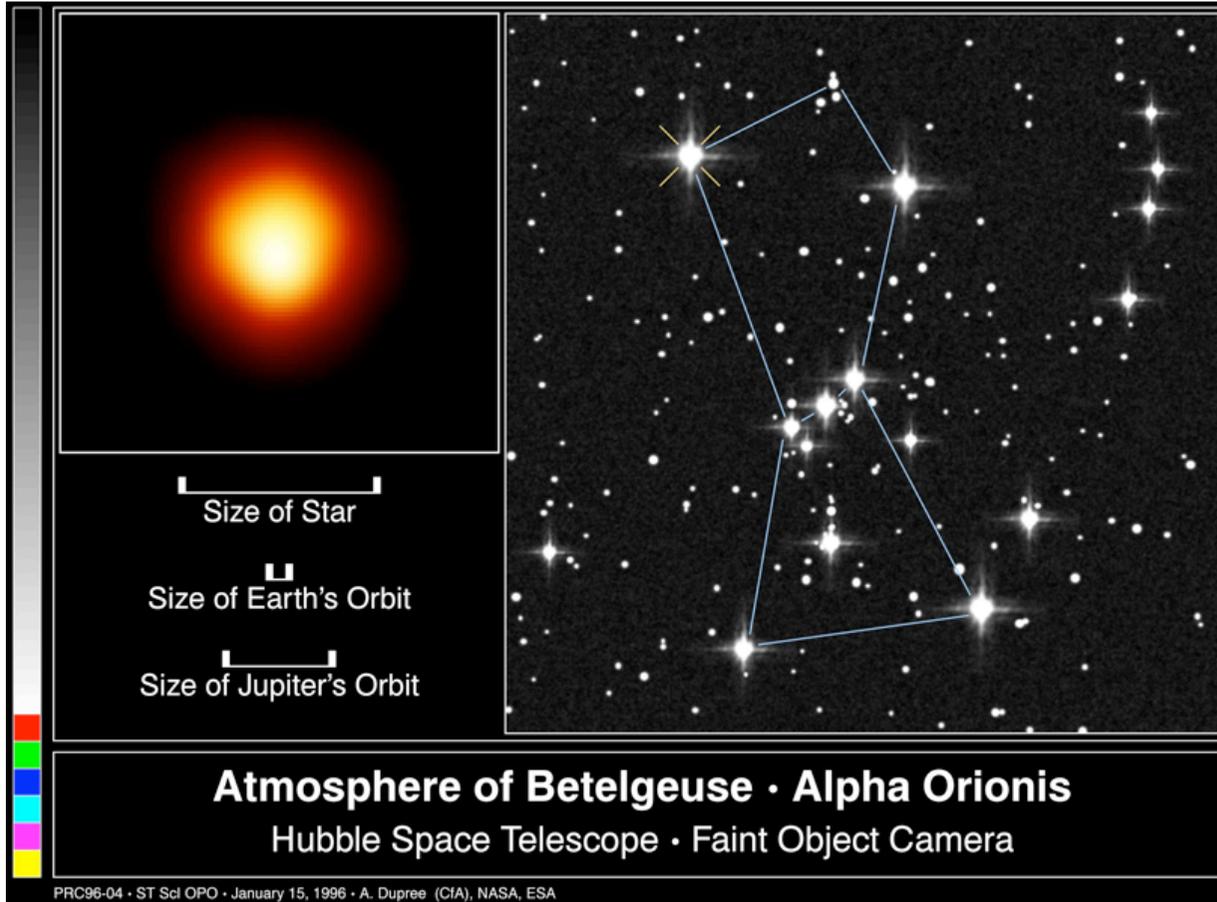


Other Stars: Supernova Explosions as Cosmic WMD

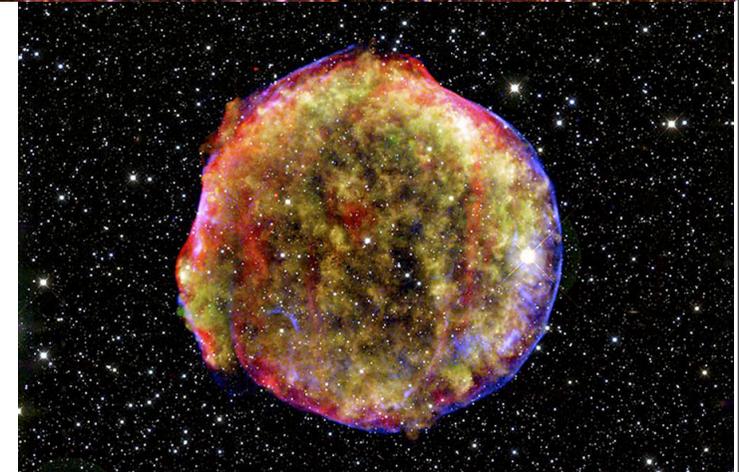
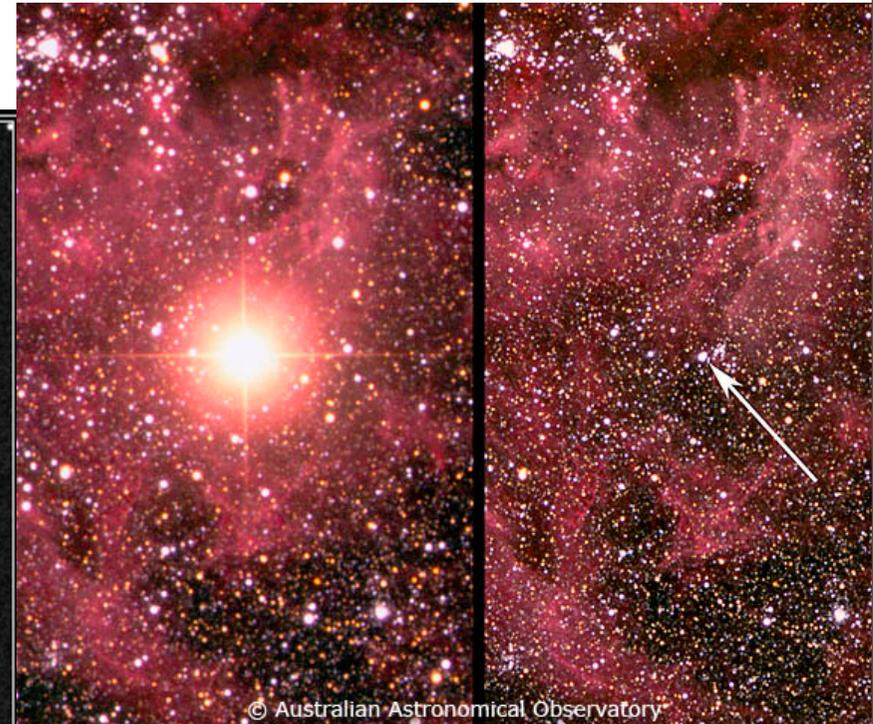
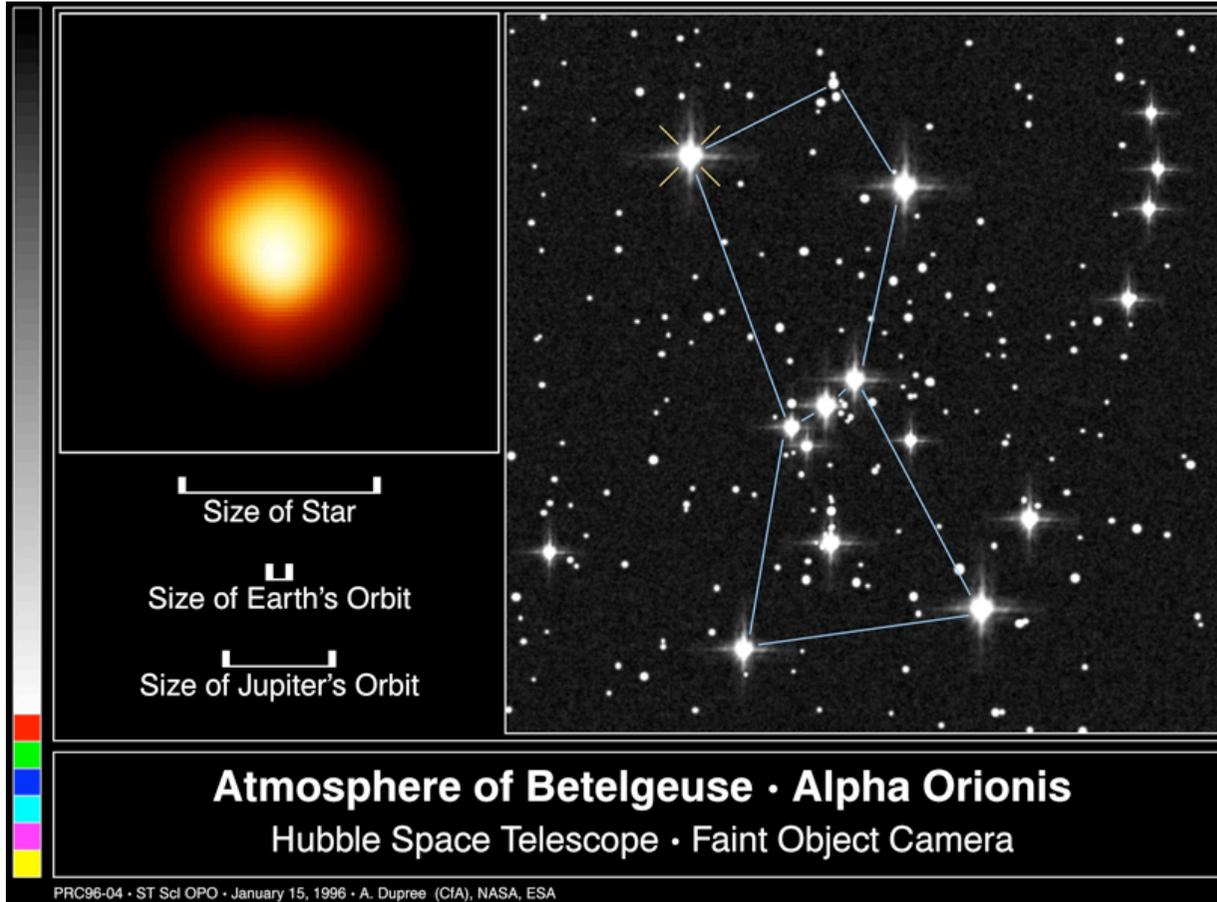


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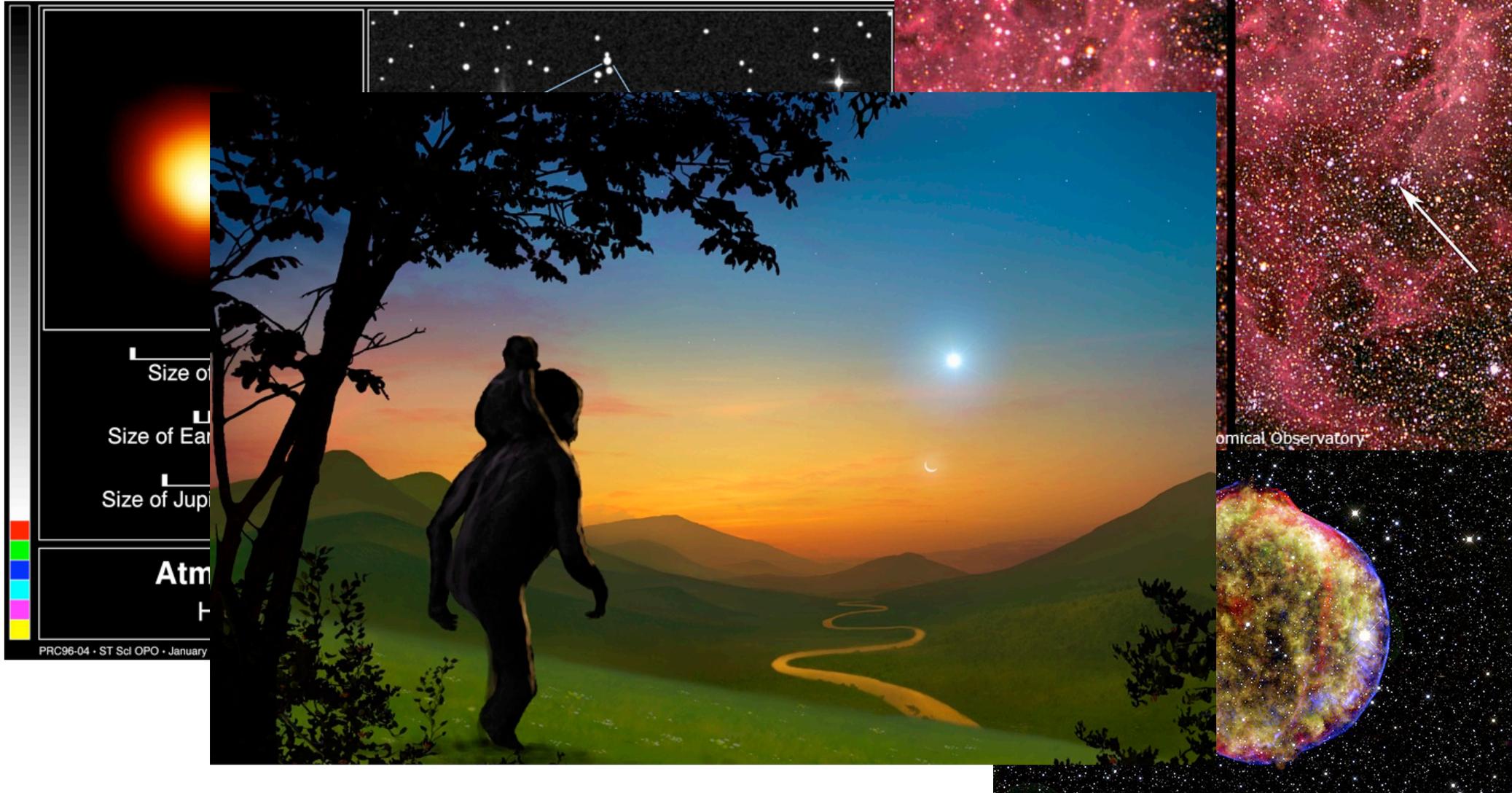


Other Stars: Supernova Explosions as Cosmic WMD



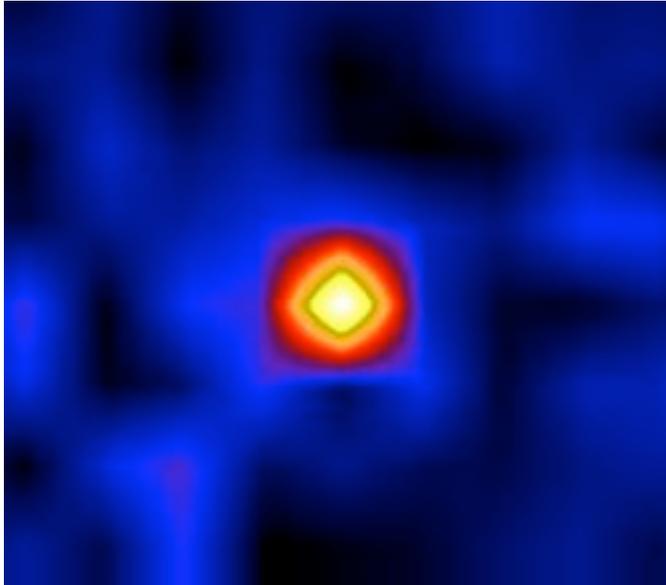
I hate when that happens.

Other Stars: Supernova Explosions as Cosmic WMD

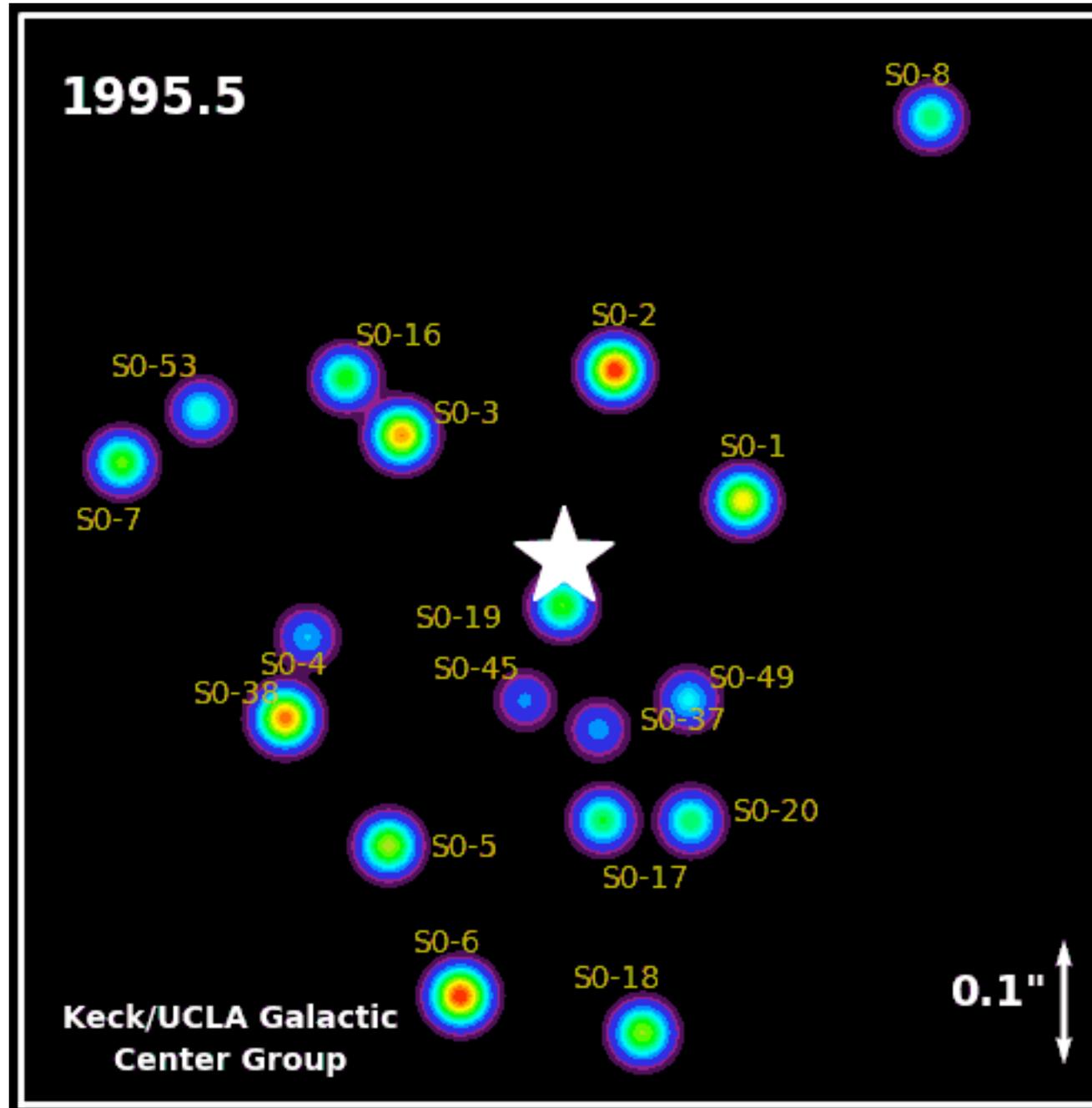
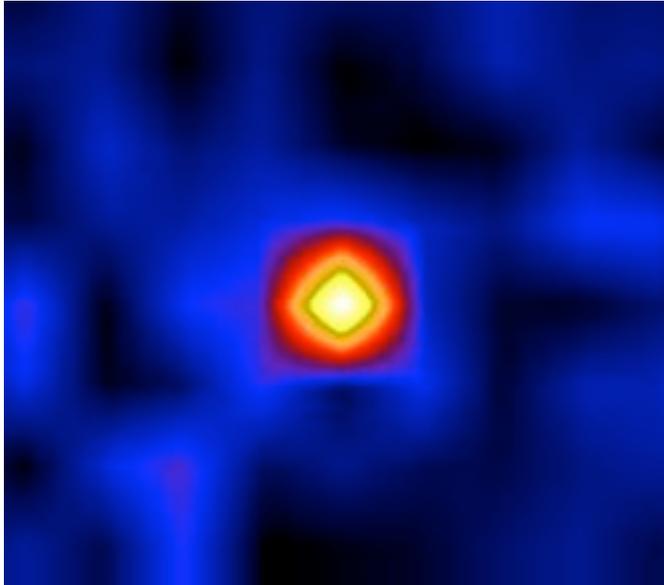


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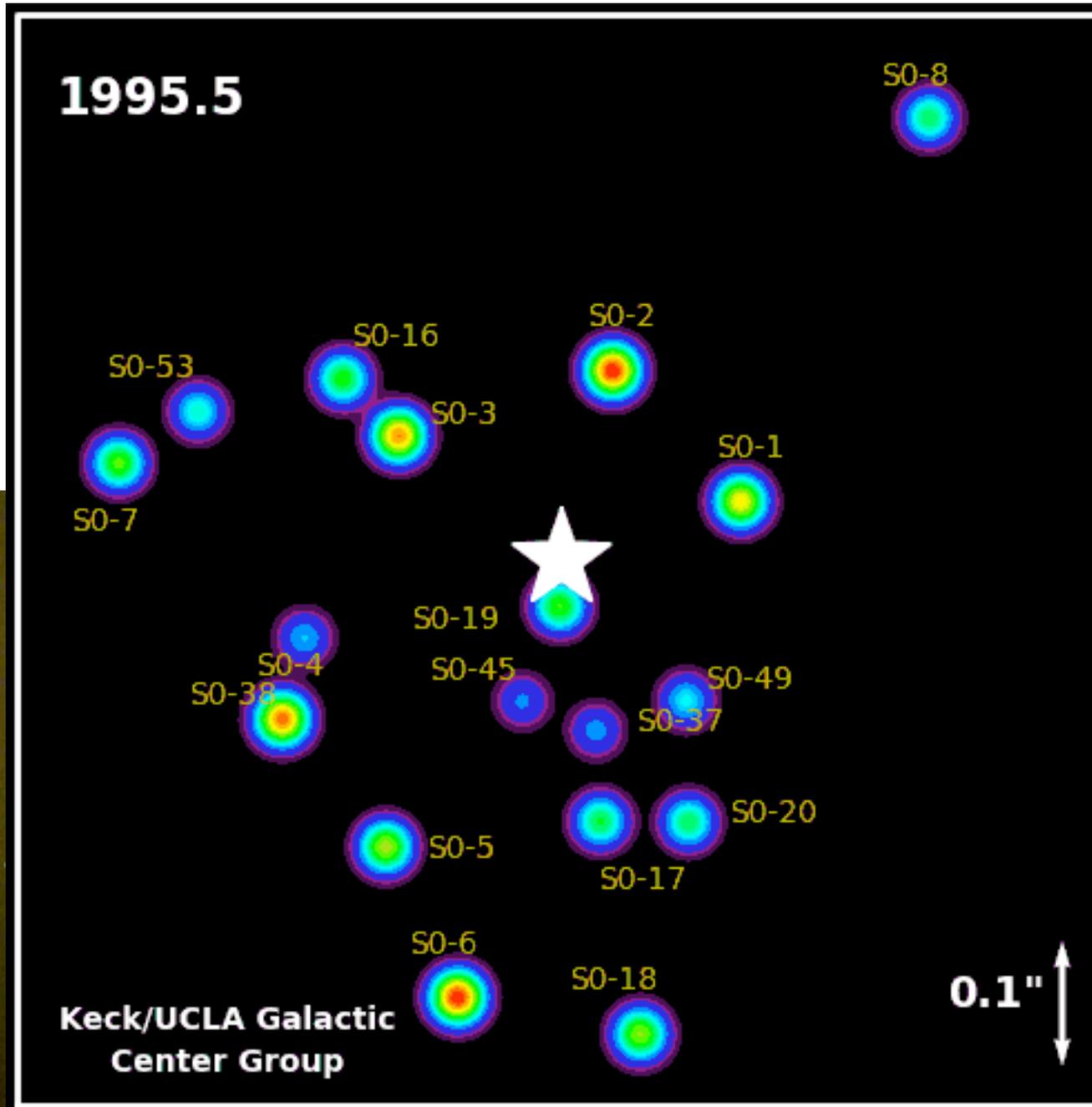
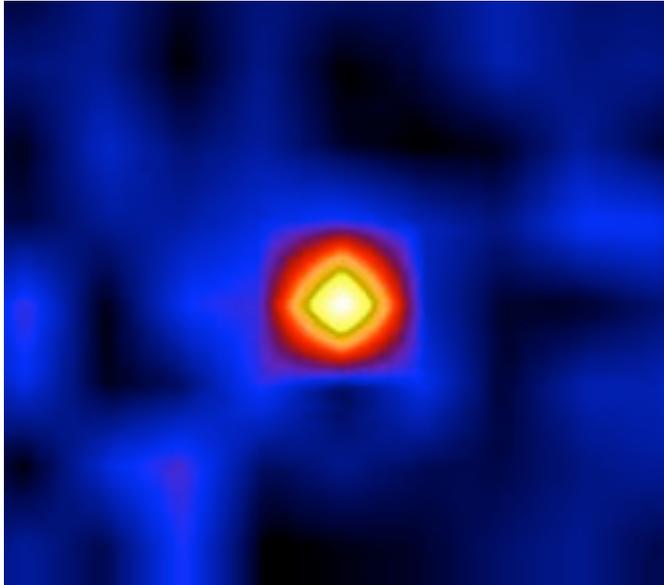
Black Holes



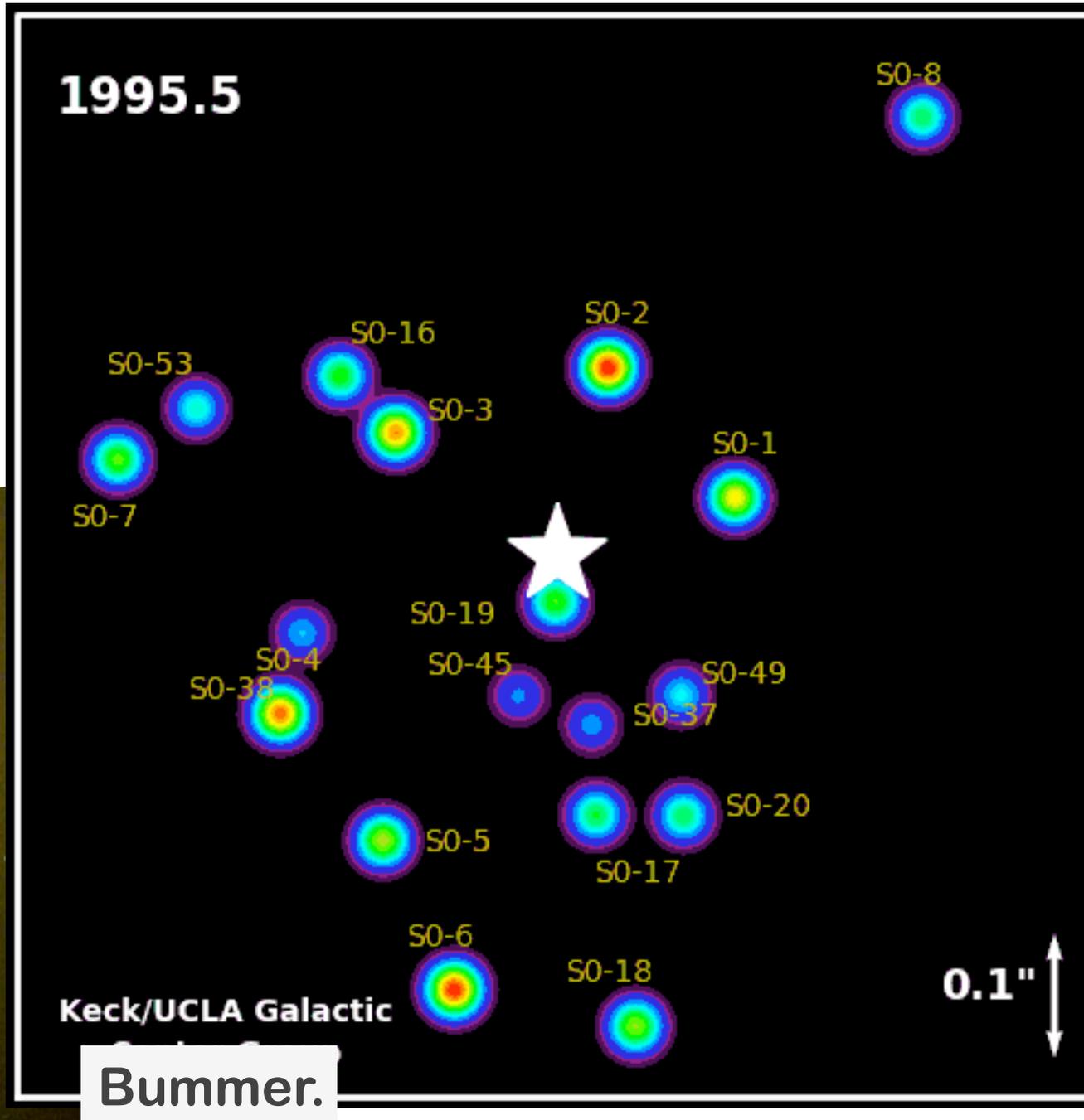
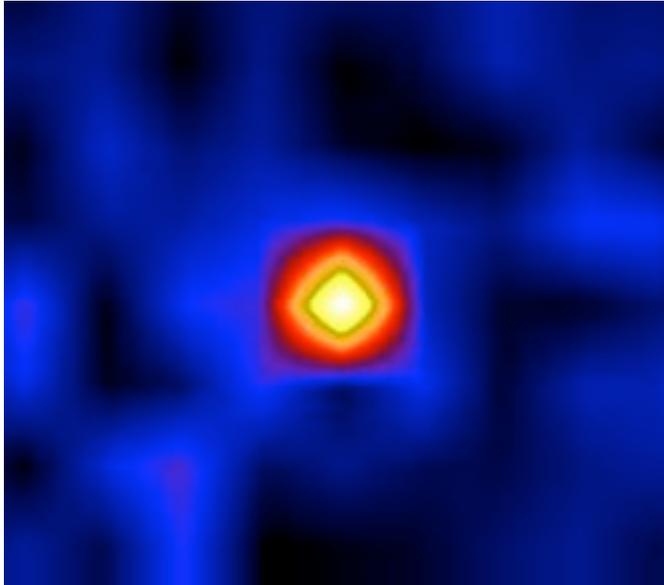
Black Holes



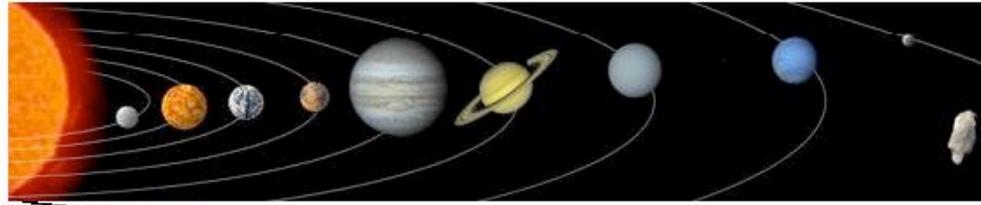
Black Holes



Black Holes

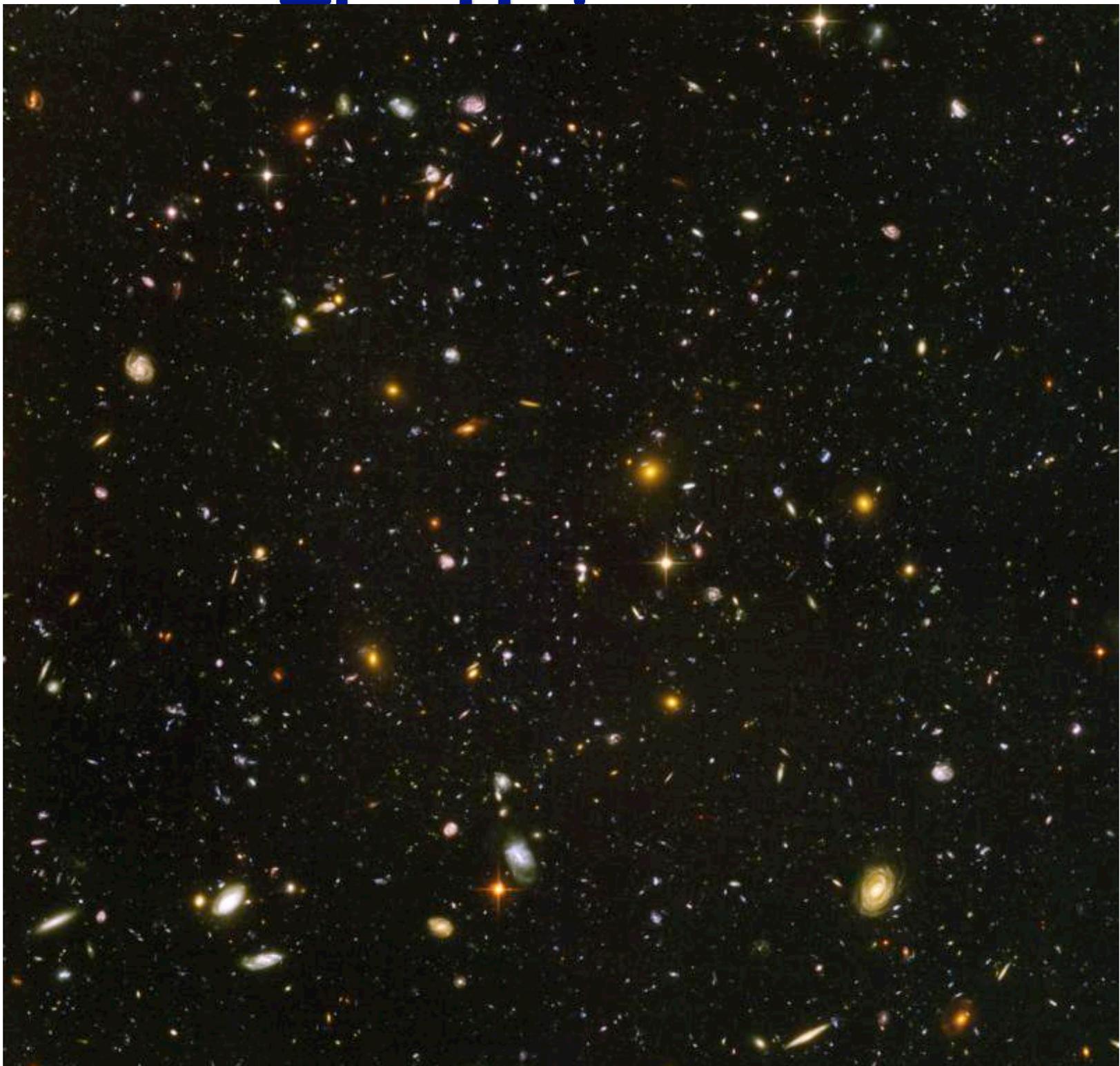


The Big Picture



The Universe: The End





Wednesday, January 18, 2012



Game over, man.

iClicker Poll: Cosmic Threat Assessment

Vote your conscience = no wrong answers!

Which of these is the **most likely** cosmic threat to you and your descendants?

- A. asteroid/comet collisions with earth
- B. solar storms
- C. supernova explosions
- D. black holes
- E. the end of the Universe

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

10. Alien Attack - Are we alone?

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9. The End of Everything - Dark Energy and the Fate of the Universe

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8. Galaxy Collisions - Milky Way vs. Andromeda

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7. Death by Black Hole - Black Holes don't suck, but if they hit you it sucks

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

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7. Death by Black Hole - Black Holes don't suck, but if they hit you it sucks

6. Death of the Sun - Burn the land and boil the sea

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

5. Gamma Ray Bursts - Cosmic Blowtorches

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

5. Gamma Ray Bursts - Cosmic Blowtorches

4. Nearby Supernova - Cosmic WMD?

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

5. Gamma Ray Bursts - Cosmic Blowtorches

4. Nearby Supernova - Cosmic WMD?

3. Orbital Chaos - Jupiter wreaks havoc with planet orbits

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

- 5. Gamma Ray Bursts - Cosmic Blowtorches**
- 4. Nearby Supernova - Cosmic WMD?**
- 3. Orbital Chaos - Jupiter wreaks havoc with planet orbits**
- 2. Solar storms - Magnetic bubble, coil, and trouble**

From the Home Office in Urbana Illinois

Top 10 Ways Astronomy Can Kill you or your Descendants

5. Gamma Ray Bursts - Cosmic Blowtorches

4. Nearby Supernova - Cosmic WMD?

3. Orbital Chaos - Jupiter wreaks havoc with planet orbits

2. Solar storms - Magnetic bubble, coil, and trouble

1. Impacts! Splat.. Boom... Watch out for space rocks!

iClicker Poll: Astro-Threats vs Other Dangers

Vote your conscience!

Which of the following do you think causes more deaths in the world than the others?

- A. War
- B. Poisoning
- C. Melanoma (skin cancer)
- D. STDs (not counting HIV/AIDS)
- E. Astronomy related deaths

iClicker Poll: Astro-Threats vs Other Dangers

Vote your conscience!

Which of the following do you think causes more deaths in the world than the others?

A. War	0.3%
B. Poisoning	0.61%
C. Melanoma (skin cancer)	0.12%
D. STDs (not counting HIV/AIDS)	0.32%
E. Astronomy related deaths	None known yet

CAUSES OF DEATH, USA, 2002

FORMAL NAME	INFORMAL NAME	% ALL DEATHS
(1) Diseases of the heart	heart attack (mainly)	28.5%
(2) Malignant neoplasms	cancer	22.8%
(3) Cerebrovascular disease	stroke	6.7%
(4) Chronic lower respiratory disease	emphysema, chronic bronchitis	5.1%
(5) Unintentional injuries	accidents	4.4%
(6) Diabetes mellitus	diabetes	3.0%
(7) Influenza and pneumonia	flu & pneumonia	2.7%
(8) Alzheimer's Disease	Alzheimer's senility	2.4%
(9) Nephritis and Nephrosis	kidney disease	1.7%
(10) Septicemia	systemic infection	1.4%
(11) Intentional self-harm	suicide	1.3%
(12) Chronic Liver/Cirrhosis	liver disease	1.1%
(13) Essential Hypertension	high blood pressure	0.8%
(14) Assault	homicide	0.7%
(15) All other causes	other	17.4%

<http://www.benbest.com/lifeext/causes.html>

If you must worry...

FIVE LEADING CAUSES OF DEATH, USA, AGES 15-24, 1998

CAUSE	PERCENT OF TOP 5	NUMBERS
(1) Accidents	51.8%	12,752
(2) Homicide	21.3%	5,233
(3) Suicide	16.3%	4,003
(4) Cancer	6.8%	1,670
(5) Heart Disease	3.9%	961

Astronomy Can Cause Death on Global Scale

Disaster, actually means “bad star”

Real chance of astronomy killing you is minimal

But, astronomy can literally destroy the Earth (or at least, wipe out all life on it)

Will set the limit on the eventual lifetime of our civilization

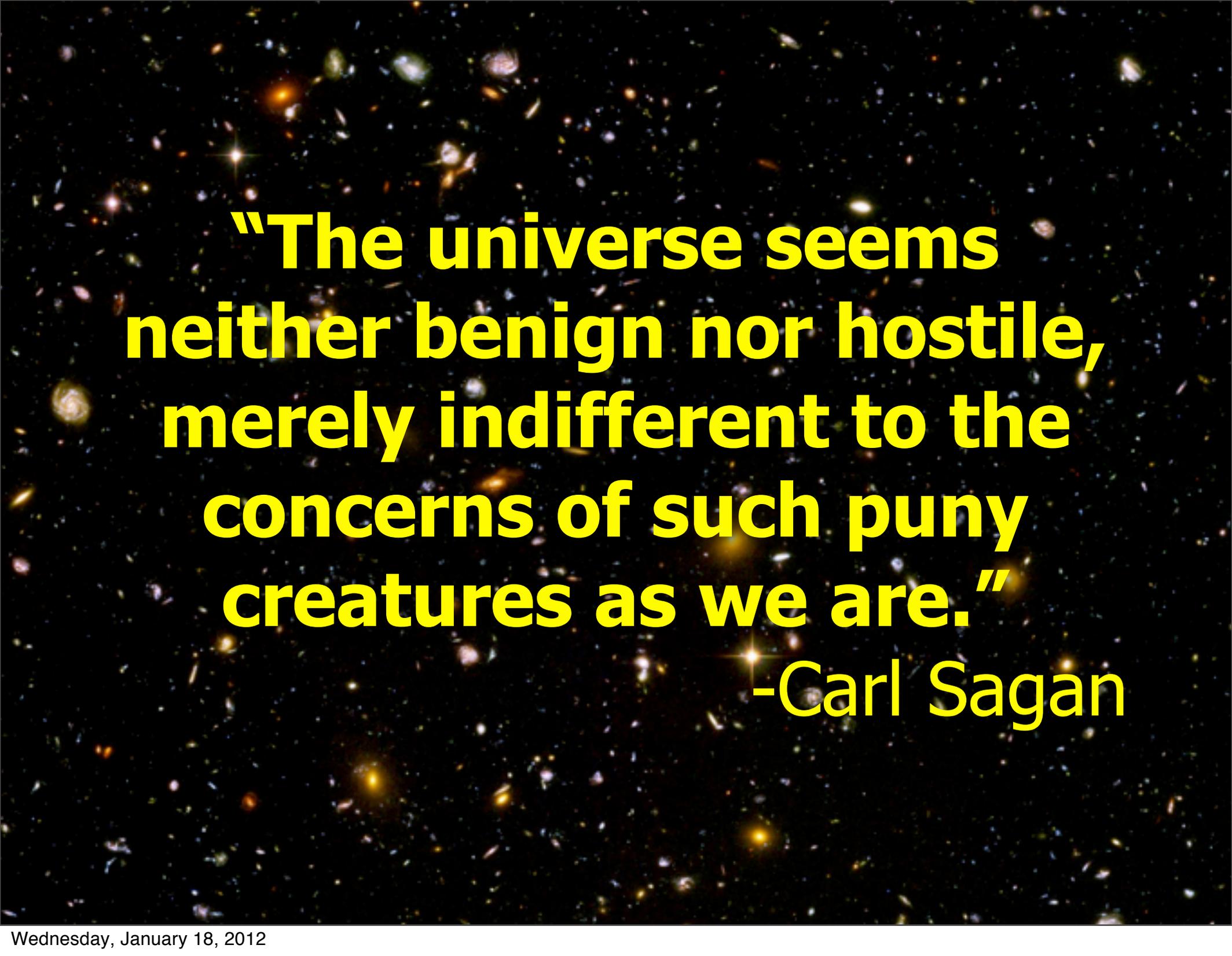
But Astronomy is also responsible for life!

We are the products of the Big Bang and 14 billion years of cosmic history after.

Most of the atoms in your bodies were created in supernova explosions.

The creation of stars and planets leads to black holes, but more often leads to homes for life.

Just in the past 2 months the first planets discovered that could be habitable!



**“The universe seems
neither benign nor hostile,
merely indifferent to the
concerns of such puny
creatures as we are.”**

-Carl Sagan



This Course

Course Goals

After this course one should be able to:

Understand our current scientific view of the Universe

Understand and put in context the risks of astronomical disasters

Make informed decisions about science policies in the future

Appreciate and evaluate new discoveries and “discoveries”

Course Website

This course will make heavy use of its website (through ATLAS)

<http://courses.atlas.illinois.edu/ASTR/ASTR150>

Weekly readings will be posted

Lecture notes

Online Homework

Online Lab Exercises

Information on Observing/Planetarium Sessions

Course Grade

Component	% of Course Grade
Online Homework (10 of 11)	20% (10 at 2% each)
Observing Sessions (2 of 3)	5% (2 x 2.5% each)
Online Labs (2)	10% (2 x 5% each)
Participation: iClicker polls	5%
Exams (3)	60% (3 x 20% each)
TOTAL	100%

Online Homework

around 20 multiple-choice questions each

Assigned weekly (except midterm week)

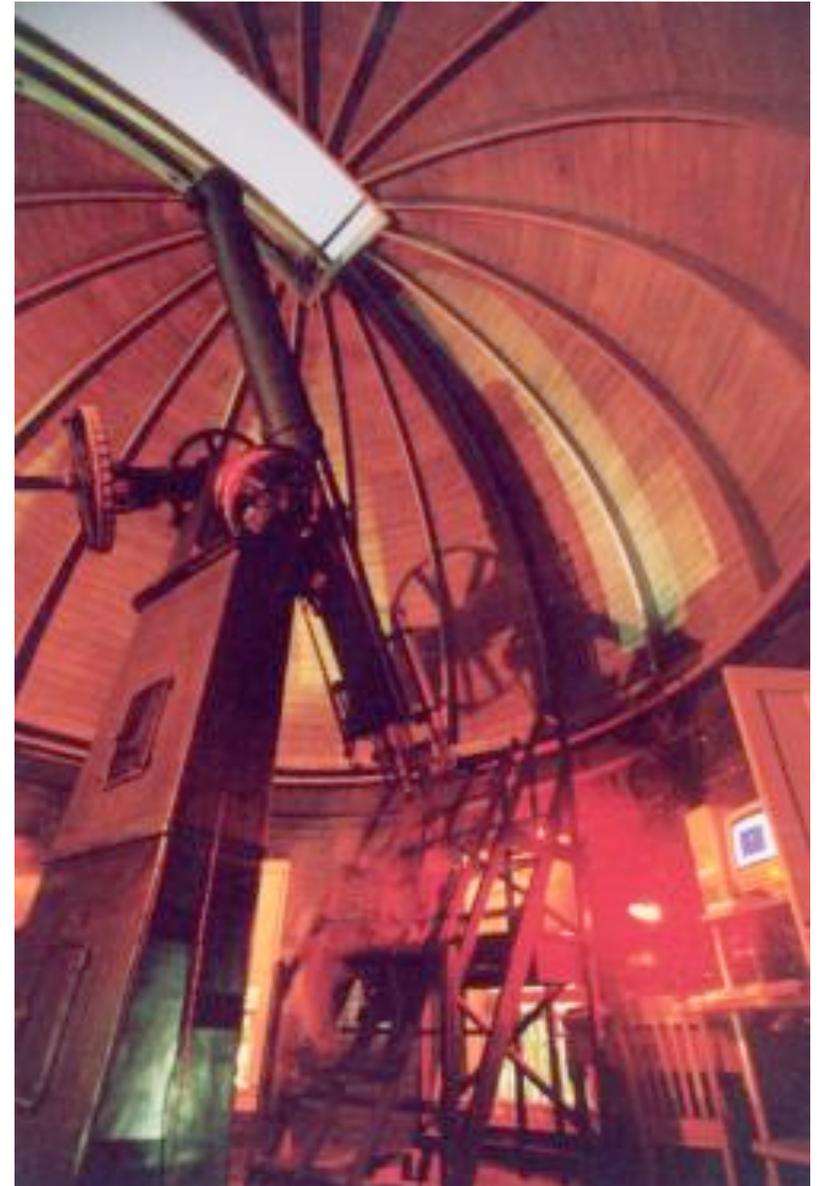
- ▶ **Due by class time on the posted due date (the following Friday)**

11 homeworks total

- ▶ **Lowest homework score dropped**

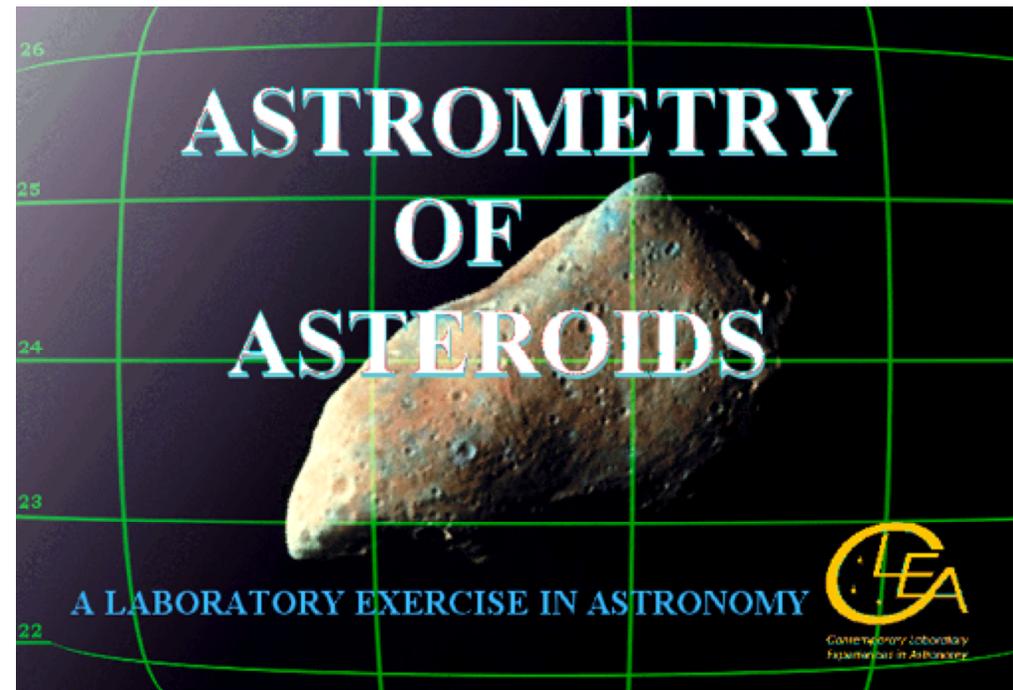
Observing/Planetarium Activities

- ▶ 3 observing activities to complete this semester
 - ▶ Planetarium Session
 - ▶ Night Observing Session
 - ▶ Solar Observing Session
- ▶ Dates and times to be posted on class website
- ▶ Worksheet to turn in for each activity
- ▶ Contact me ASAP if you have a conflict with an activity



Computer Labs

- ▶ Two computer-based lab exercises
- ▶ Astrometry of Asteroids
 - ▶ Introduces the methods that we use to detect asteroids
- ▶ The Sun and Solar Activity
 - ▶ Use observations of the Sun to explain sunspots and flares



iClickers

- ▶ Concept check questions and polls will be asked in class
- ▶ Each question worth 1.5pts
 - ▶ 1 point for attempting the question
 - ▶ 0.5 points for a correct answer
 - ▶ Up to a 50pt maximum total for the semester
- ▶ around 70 questions over the semester
- ▶ iClicker 1 or 2 okay (I think)



Why i>Clickers?

Active learning lasts longer than passive listening

When you answer a question, you remember the answer better than if I just told you the answer

Discussion of questions with classmates promotes better understanding

i>Clicker use can lead to higher grades

Allow me to assess class understanding in a way anonymous to your fellow students

Registering Your i>Clicker

- ▶ To receive i>clicker credit, your i>clicker must be registered to your NetID
- ▶ Your clicker's serial number is on the back of the unit
- ▶ Link on the class website to register your clicker
- ▶ Your clicker ID may contain the number zero, but will not contain the letter O



Exams



Three non-cumulative exams (no comprehensive final)

- ▶ **Exam 1: Friday, Feb. 17th, in class**
- ▶ **Exam 2: Friday, Apr. 6th, in class**
- ▶ **Exam 3: Wednesday, May 2nd, in class**
- ▶ **All exams in the regular classroom**

Resources Permitted

- ▶ **Calculator, pencils**
- ▶ **Note sheet: 8.5"x11" piece of paper (both sides)**
- ▶ **Bring your University ID**

Grading Scale

Letter Grade(s)	Approximate Range
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	below 60%

For next time

Read Syllabus

Get ready to hit the ground running!



Questions?