



Director: Dr. Sultana N. Nahar, The Ohio State University, USA

**Assalamu alaikum, Nameskar, Good Morning!**

Dear our participants - the future Scientists, Respected Teachers, Alumni, our Chief Guest Prof. Tabassum Shahab, Guest of Honors Dr. Hameeda Tariq, Prof. Naima Khatoon, OSU representatives, international experts, local expert and contacts, volunteers

**WELCOME TO THE WOMEN IN STEM ROADSHOW!**

• Women in STEM Roadshow (WSR) is a project of US Mission India under US Department of State

**Objectives:** Support and encourage young female students from minority and disadvantaged groups across India in choosing careers in STEM (science, technology, engineering, mathematics) fields

- With this objective, the workshop has been designed to demonstrate the importance of STEM and provide relevant scopes and tools
- The project has 9 workshops, each of 2 days, and a year long monitoring and evaluation of STEM activities of the participants
- The scheduled workshops are: 2 in Delhi, 2 in Hyderabad, 2 in Kolkata, 1 in Patna, 1 in Kurnool, 1 in Aligarh

**WSR WORKSHOP 9: Aligarh, Feb 23 - 24, 2018**

**Support: US Department of State**

## **WORKSHOP STRUCTURE**

- The workshop has 3 main sessions
  - I: Objectives, overview, why STEM
  - II: Strategy for teaching and learning skills, train for the careers
  - III: EducationUSA that provides information of US universities and how to apply for higher studies
- 2 Pre-sessions, Certificate ceremony
- Participants of the workshops are students in the STEM from a number of universities and colleges, some high school students, a few teachers, one US alumnus/alumna
- In each workshop we are giving i) stipends to students as needed, ii) Mentor Fellowships to two participating teachers in STEM

## **ROADSHOW ACTIVITIES**

- The mentors, usually one college and one high school teachers, will be grooming the students in STEM fields
- The students and mentors will report activities a few times until end of the project in September 2018

- The participating alumni are committed to spend two hours in high schools to encourage and answer questions to female students in STEM
- Our local experts and their teams have done considerable amount of field work in recruiting the participants

### **MONITORING and EVALUATION**

- STEM related activities will be encouraged and recorded and evaluated by our team at the Indo-US APJ Abdul Kalam STEM Education and Research Center of Aligarh Muslim University and Ohio State University in Aligarh

- Participants will remain connected through networks

- i) emails: [womenstemroadshows@gmail.com](mailto:womenstemroadshows@gmail.com),

- ii) facebook: [womeninstemroadshow](https://www.facebook.com/womeninstemroadshow)

- iii) twitter: <https://twitter.com/Womeninstem33>

- Updates will be posted at WSR website:

<http://www.astronomy.ohio-state.edu/~nahar/womenstem>

or [go.osu.edu.womenstemroadshow](http://go.osu.edu/womenstemroadshow) (both are the same)

- WSR in the news: Aligarh, Delhi, Hyderabad, Kurnool, Patna





# WORKSHOP TEAM MEMBERS

Director: DR. SULTANA N. NAHAR





**Prof. Sultana Nahar, (Ph.D. Physics, USA), Atomic Astrophysicist, Astronomy Department, the Ohio State University**

- Research interest: Atomic processes in astrophysical plasmas, has developed new methodologies, co-authors with Prof. A.K. Pradhan the textbook "Atomic Astrophysics and Spectroscopy" (Cambridge U press 2011), and creator of the database NORAD-Atomic-Dara.
- Fellow of American Physical Society, APS Woman Physicist of Month
- Since 1995, she has been involved in promotion of STEM education and research in developing countries by
  - teaching research based courses with computational workshops, and research guidance,
  - establishing recognition program for the best research, teachings, and academic performances in many institutions in five countries,
  - maintaining a network of scientists from 23 countries,
  - founded the International Society of Muslim Women in Science with members from 28 countries.
- With K. Irving and A.K. Pradhan, she has developed the science research based M.Ed course at OSU.
- Associate Director (Research) for STEM Faculty training project of OSU-AMU of US Department of State
- OSU Co-Director (Research), Indo-US APJ Abul Kalam STEM Center for Education and Research of OSU-AMU
- Director, Women in STEM Roadshow of US Department of State.

**International Expert: Dr. Nasreen Haque**

**(Ph.D. Physics, USA), CEO, Intalage, Inc, USA, STEM education involving teachers and students in the USA**



**International Expert: Dr. Karen Irving (Ph.D. Science education, USA), Teaching and Learning, OSU, developed STEM program for postgraduate Indian Graduate students under the Indo-US Knowledge Initiative award**





**Consultant: Dr. Anil Pradhan (Ph.D. Physics, England),  
Astronomy, OSU, Director: Indo-US APJ Abdul Kalam  
STEM Education and Research Center of OSU-AMU**



- **OUR LOCAL EXPERTS, CONTACTS, VOLUNTEERS:**

**Delhi:** Local Expert: Dr. Noor-e-Zhahra (Ph.D. Engineering), recipient of national teaching award

Volunteers: Diskshya Bhatta (Dentistry, Sharda University), Shah S. A. Rabbanai, Juhaid Farooq

**Kolkata:** Local Expert: Madiha Ahmad (B.Sc.Hon. Botany, Teacher Training Course, Calcutta University, Talent Manager, Lifebushido, USA)

Local contact: M. Sagheerul Islam (B.A, M.BA, Calcutta University, Data management)

Volunteers: Fatima Sultan (B.Ed, Aliah University), Ifra Nadeem (B.Sc. Psychology, Loreto College)

**Patna:** Local Expert: Syed Hasanain (B.A.,M.A., Patna University, involved with charity work, human resources in teaching) Volunteers: Md Zohaib Hassan, Kaustobh Singh

**Hyderabad:** Local Expert: Meherunissa Nida Mir (B.Sc. in Biotech, M.Sc. student in Psychology, St. Francis College, project involved with issues of minority women)

Volunteers: Captain M.S. Ali, Syeda Talat, Sara

**Kurnool::** Local Exper: Dr. Jahanara Momen (Zoology, Osmania College)

Local Conact: Abdul Aziz Siddiqui (District Coach, Sports Authority of India), Captain Ali, Dr. Nasreen Haque,

**Aligarh::** Local Experts: Prof. Farukh Arjmand, Dr. Sabiha Parveen, Swaleha Naseem

Volunteers: Siffeen Lehra (PG Chemistry, AMU), Dr. Mohammad Usman (PG Chemistry, AMU)



## CHIEF GUEST

- Each workshop has a symbolic Guest - a role model/ promoter/ or activist of women education and empowerment

### Delhi:

- Workshop 1: Chief Guest Dr. Najma Heptullah - a role model of achievements for females - career expanded from Ph.D. in Zoology to philanthropy to leadership
- Workshop 2: Chief Guest Dr. P. Basak, Director of Science Institute of Meerut University, a promoter of women education in STEM

### Kolkata:

- Workshop 3: Chief Guest Minister Chandrima Bhattacharya (representing Chief Minister Mamata Banerjee)
- Workshop 4: Chief Guest Prof. Ghazala Yasmin, Journalism, Alia Government Urdu University

### Patna:

- Workshop 5: Dr. Sister Marie Jessie, A.C., Principal. Patna Women's College

## CHIEF GUEST

### Hyderabad:

- Workshop 6: Dr. Farida Hussain (Economics, a well known activist for women empowerment, Elected joint secretary and Vice President, President (current) of All India Women conference (AIWC), in charge of National Integration of AIWC)
- Workshop 7: Dr. Syed Najamul Hasan, Dean, School of Sciences, and Head of Department of Mathematics, Maulana Azad National Urdu University, Hyderabad

### Kurnool:

- Workshop 8: Nafis Khizer, M.Sc. (Textile design & Home Science, Chennai University), teacher, a woman activist for financial independence and education, founder of NGO Meherunissa Syed Ismail Foundation

### Aligarh:

- Workshop 9: Guests of Honor: Dr. Hameeda Tariq (physician), Prof. Naima Khatoon (Head, Abdullah Women's College)





**Ex: Certificate ceremony in Hyderabad workshop No. 6  
US Alumni: Mohammad Omar Hussain (Kashmir), Engineer in Oman Petroleum (rightmost)**



- Why STEM fields
- Part of life, For advances in humanity, for survivability
  - Why females
- half of the population - half of the intellectual power to make advances
  - Should we waste our intellectual power
    - NO!

Dinosaurs ruling the earth: 65M years ago  
Asteroid impact depleted them





# OUR IDEAS FOR SURVIVAL: LASER TRACTOR BEAM FOR REPULSION OF THE ASTEROID (STAR TREK)

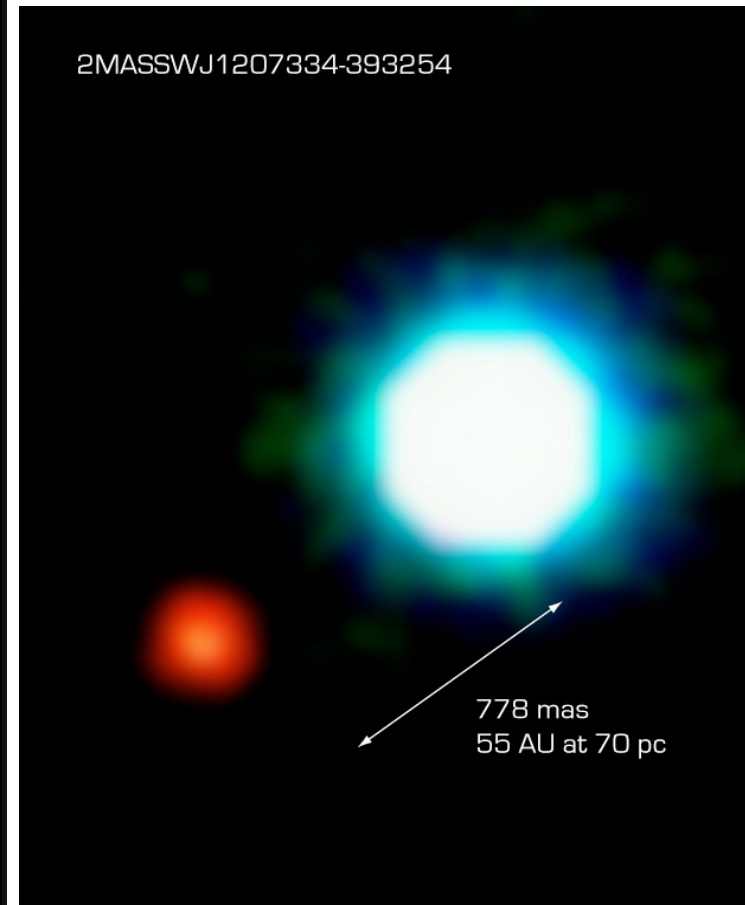
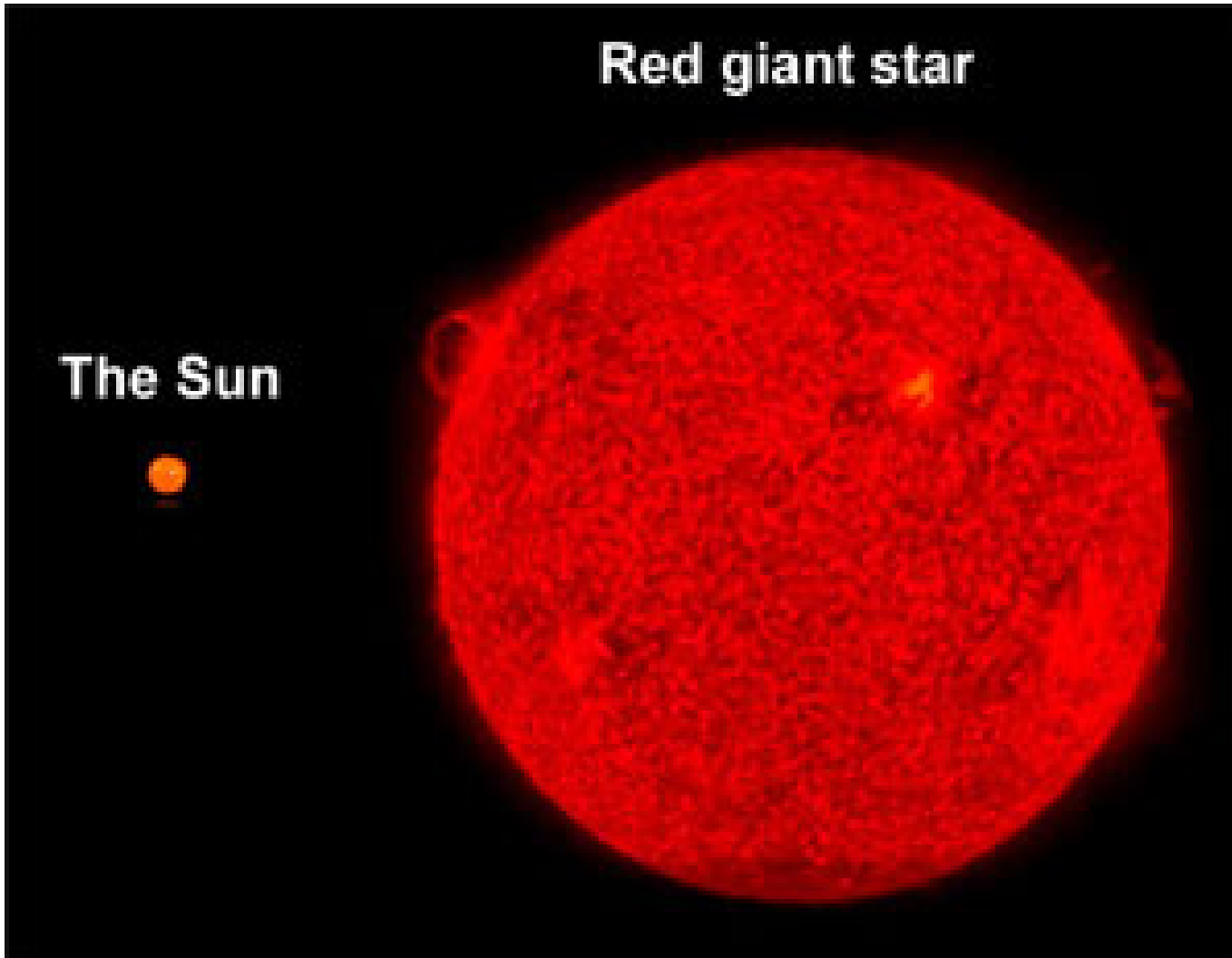
We have ideas, such as, use of a tractor beam for deflection (used in STAR TREK TV series) - requires much scientific advances for such a beam



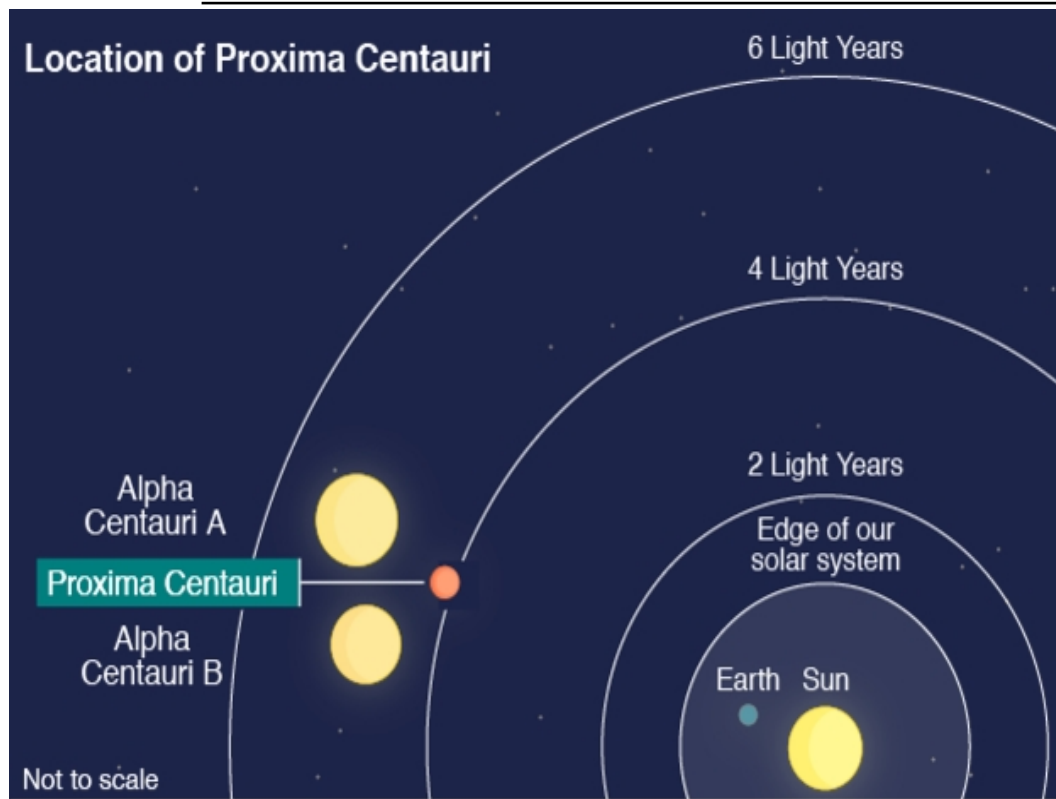


# LIFETIME OF OUR SUN: NEED NEW HOME

- Sun's fate after 6-7 billion years - Red Giant which will engulf all planets. We need to survive.
- Searching habitable exoplanets - our future home outside the earth - 11B planets in our galaxy.

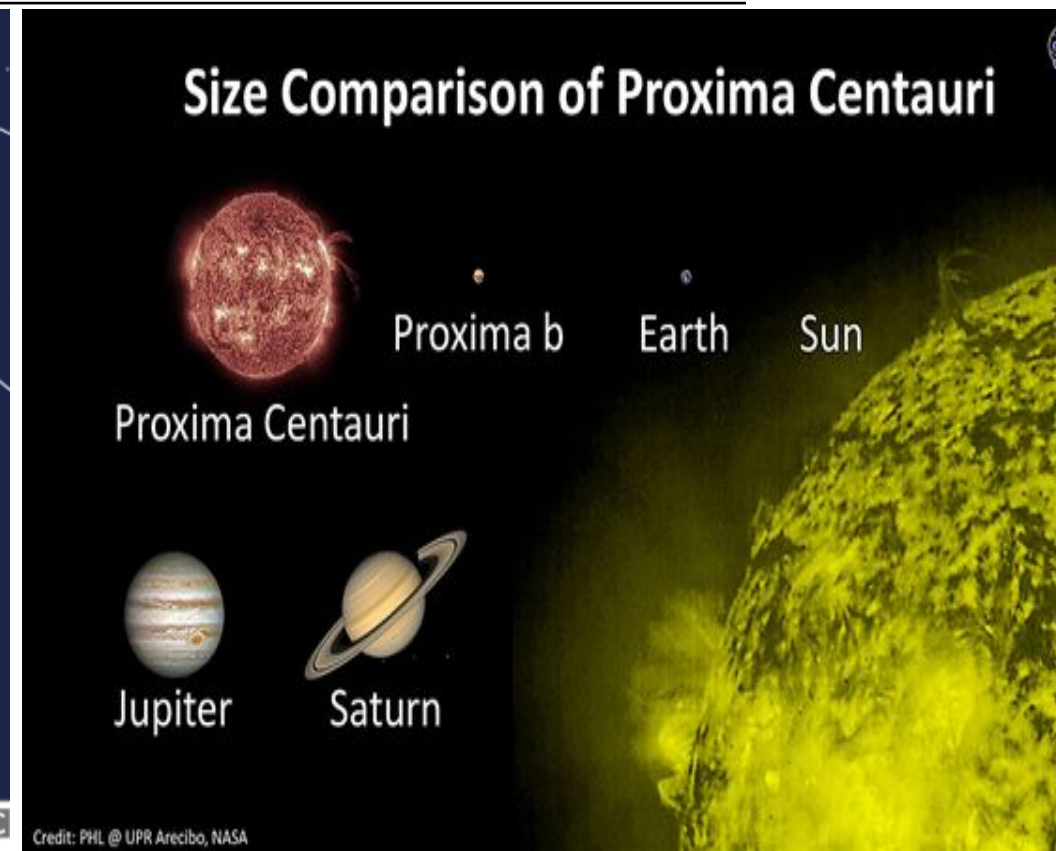


# OUR INTEREST: HABITABLE EXOPLANETS



Source: ESO

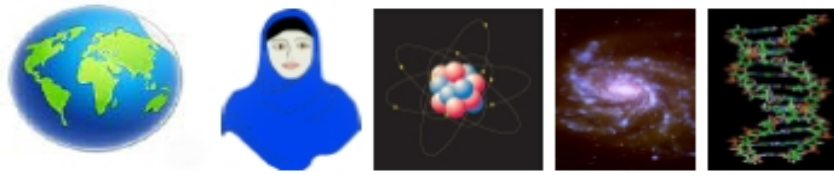
BBC



- Habitable planets where liquid water may exist
- Proxima b, exoplanet to our closest star Alpha Centauri (4 ly away: Earth-like in size, hard & rocky surface, possibility of liquid water & temperature similar to us
- But a spacecraft using current technology will take 18 thousands of years to reach it → New idea for 20 years
- 1 in 5 sun-like stars have an earth-sized planet in the habitable zone → we need scientific and technological advances to build a new home

- WSR objectives - similar to those of ISMWS

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



## INTERNATIONAL SOCIETY OF MUSLIM WOMEN IN SCIENCE (ISMWS)

### ISMWS CHARTER

Founder: Dr. Sultana N. Nahar

The Ohio State University, Columbus, Ohio, USA

April 19, 2010

- **AIM:** - encourage Muslim women in science profession, form a network for various support
- **Objective:** Stay in Science (basic or applied)
- **Motto:** Out of 24 hours a day, we keep some hours for our intellectual nourishment
- **Members:** Over 250 from 28 countries

Web: <http://www.astronomy.ohio-state.edu/~nahar/ismws.html>

For membership (free) - Email: [nahar.1@osu.edu](mailto:nahar.1@osu.edu)

## Notes from ISMWS Charter:

- Each of us, male and female, have biologically the same brain and the same capability to understand the amazing mysteries of nature, finding out the laws that govern them and implement them for our benefits and advancement. Even if we use our brain continuously, we would probably use only 10-15% of it
- No religion restricts a person from learning, gaining knowledge. Knowledge is a necessity. Islam encourages knowledge for both man and woman.
- All living forms, the world we live in, the universe around us have been created not to ignore them, but to know them for our purposes
- The more we know the universe, the nature, the human functions, living beings, the more beauty we see, the more power and control we achieve to solve problems, the more we admire Allah and His creations



# THE LONGEST RUNNING UNIVERSITY



Universit Al Quaraouiine founded in 859 in Fez, Morocco is the oldest existing, continually operating and the first degree-awarding educational institution in the world (UNESCO and Guinness World Records[5][6])

- It was founded by a female philanthropist Fatima al-Fihri

## A WOMAN: A MOTHER AND A MENTOR

- A scientist mother can play the most crucial role in building a nation - she teaches and mentors her children
- More educated mothers - more educated nation
- The female student in Abaya (on my right) achieved the topmost score in physics in the poor condition in Kashmir





# SCIENCE IS BEAUTIFUL: X-RAYS FROM A BLACK HOLE (A POWERFUL ENGINE)- CENTAURUS A GALAXY

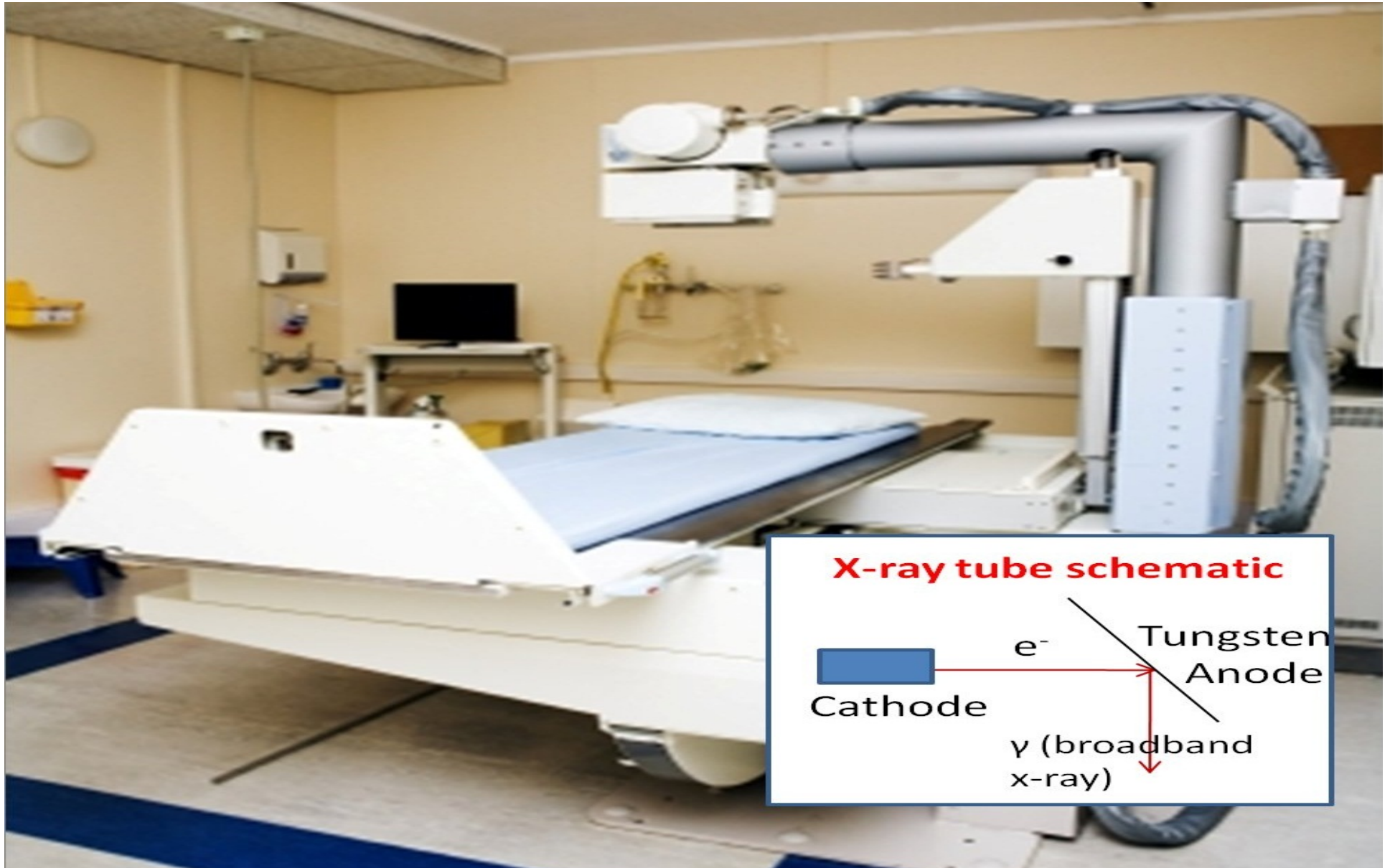


- Photometric image: red - low, green - intermediate, blue - high energy X-rays. Dark green & blue bands - dust lanes that absorb X-rays
  - Blasting from the black hole a jet of a billion solar-masses extending to 13,000 light years

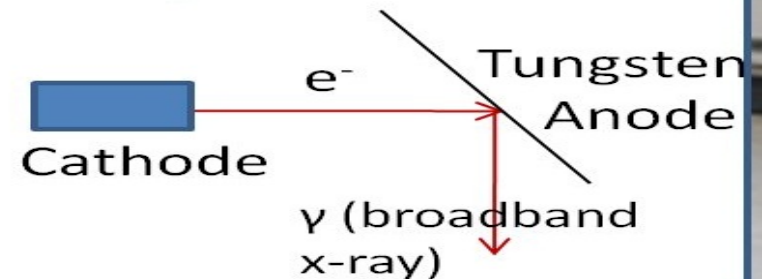
## X-RAYS IN MEDICAL FACILITIES

- Medicine: radiography, CTscans, imaging, Linear Accelerators (LINAC) for radiation therapy

Study of black hole x-rays has led to new treatment for cancer

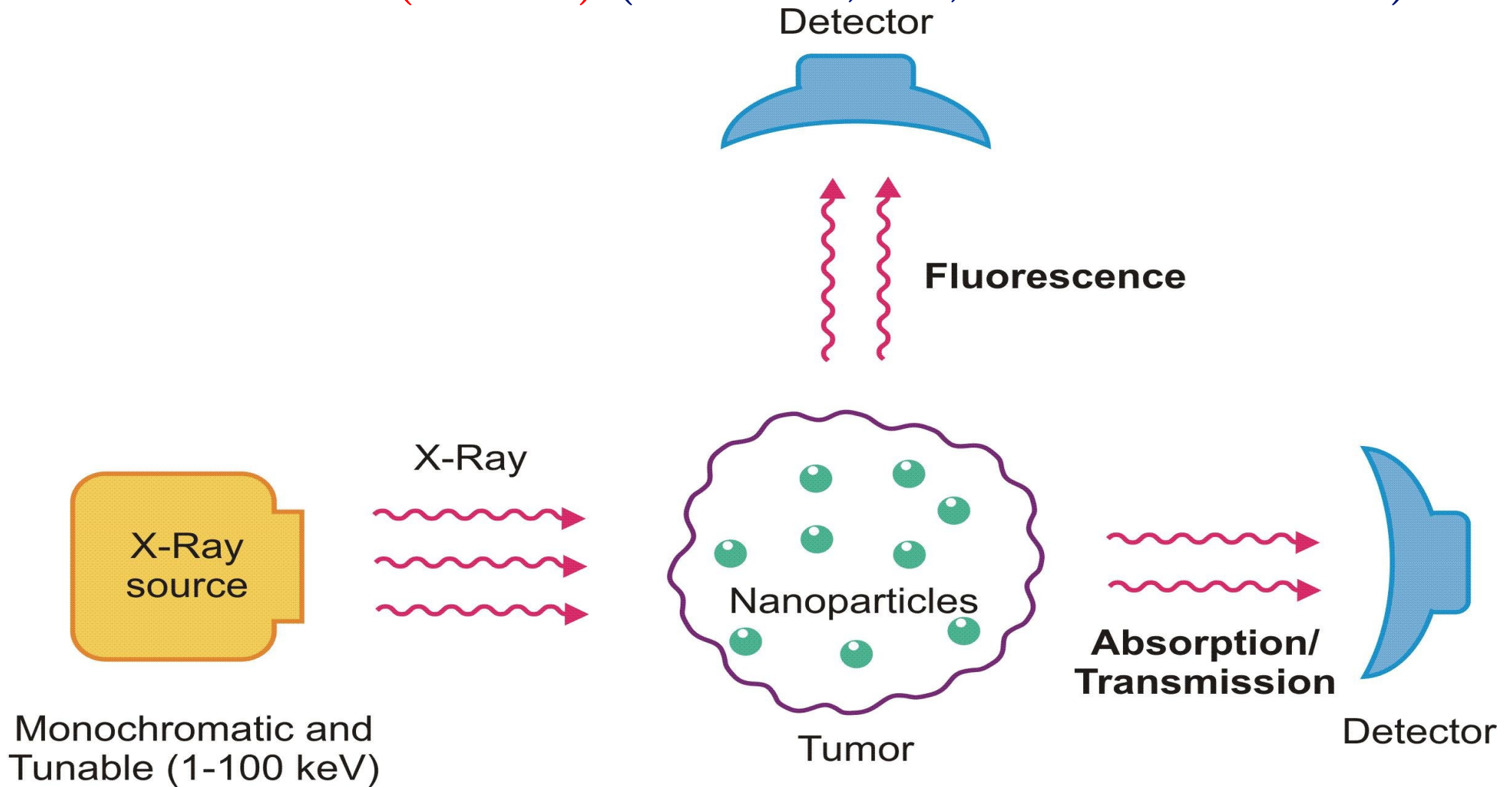


### X-ray tube schematic





# Cancer treatment: **RESONANT NANO-PLASMA THERANOSTICS (RNPT)** (Pradhan, Yu, Nahar et al 2007)



- Find narrow resonant energy regions to initiate enhanced Auger processes for large number of photons and electrons
- Replace broadband and high energy X-ray irradiation by safer narrowband monochromatic irradiation of patients

## PHYSICS INVENTIONS

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# Astronomers reach for the stars to discover new cancer therapy

Cancer Discovery

[cancerdiscovery.aacrjournals.org](http://cancerdiscovery.aacrjournals.org)

doi: 10.1158/2159-8290.CD-NB080111-13

Cancer Discovery August 2011 1; 192

## Astronomy Research Suggests Tumor Tools

py for Cancer

<http://www.astrobio.net/pressrelease/4>

### NEWS

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### Astrotherapy for Cancer

Source: [Ohio State](#) press release



**Missions**

Posted: 06/26/11

**Summary:** Astronomers have helped in developing a new radiation treatment that could aid cancer patients.

# ASTRONOMY CONTRIBUTIONS IN OUR DAILY LIFE

(Astronomy Magazine May 2012)



## What has

Wireless Internet and GPS are just two of the technologies our society uses every day — and both stem from astronomy.

by C. Renée James



## astronomy done for *you* lately?

- 1) Global Positioning System (GPS) for navigation
- 2) Wireless Internet for networking
- 3) RNPT: Treating cancer with astronomy research
- 3) Optics and the JWST technologies for laser eye surgery





THE OHIO STATE UNIVERSITY

Future Research - Multidisciplinary: OSU

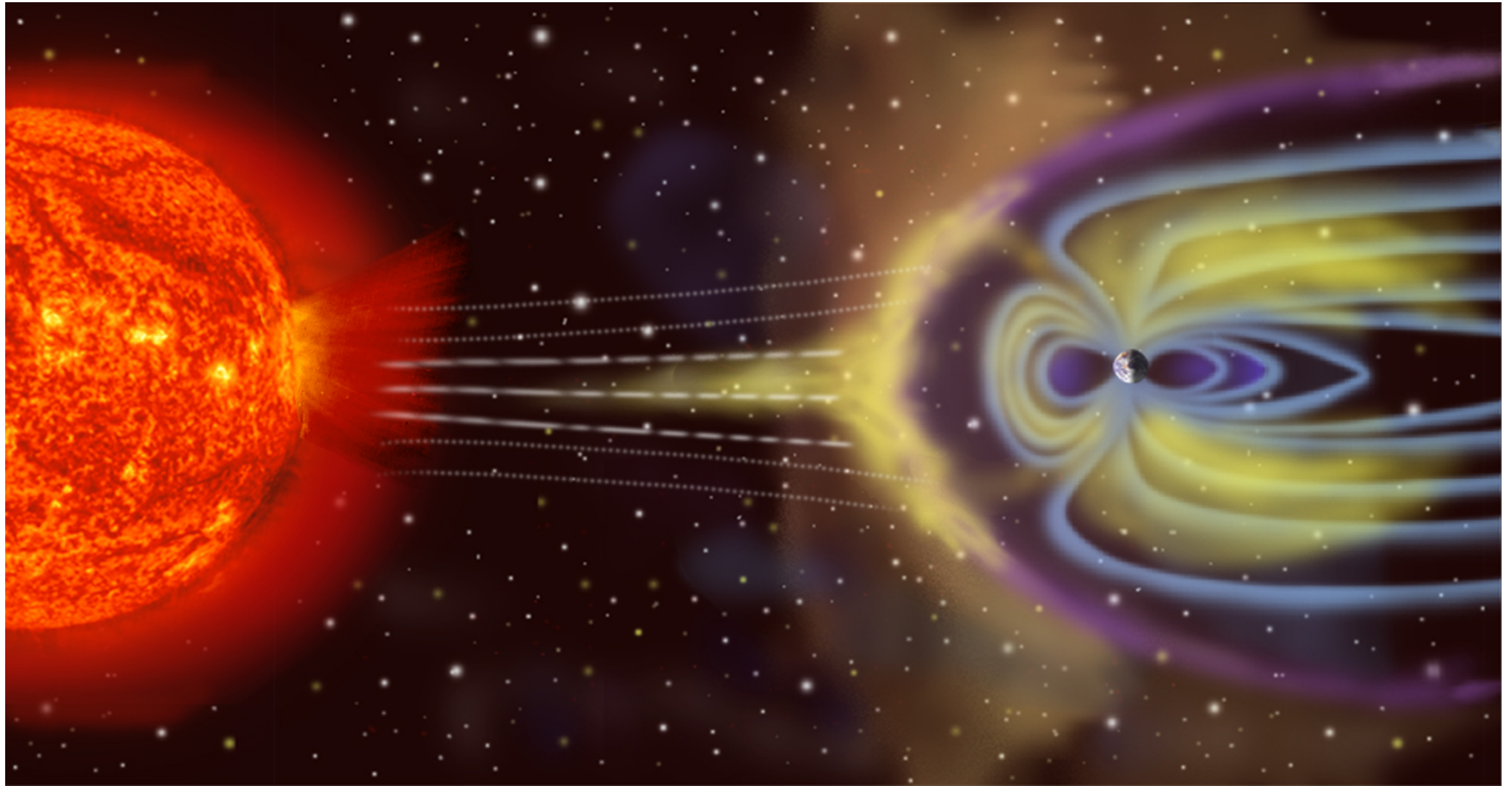
Nano-Med Group

Astronomy, Chemistry, Pathology, Radiation Oncology, Physics



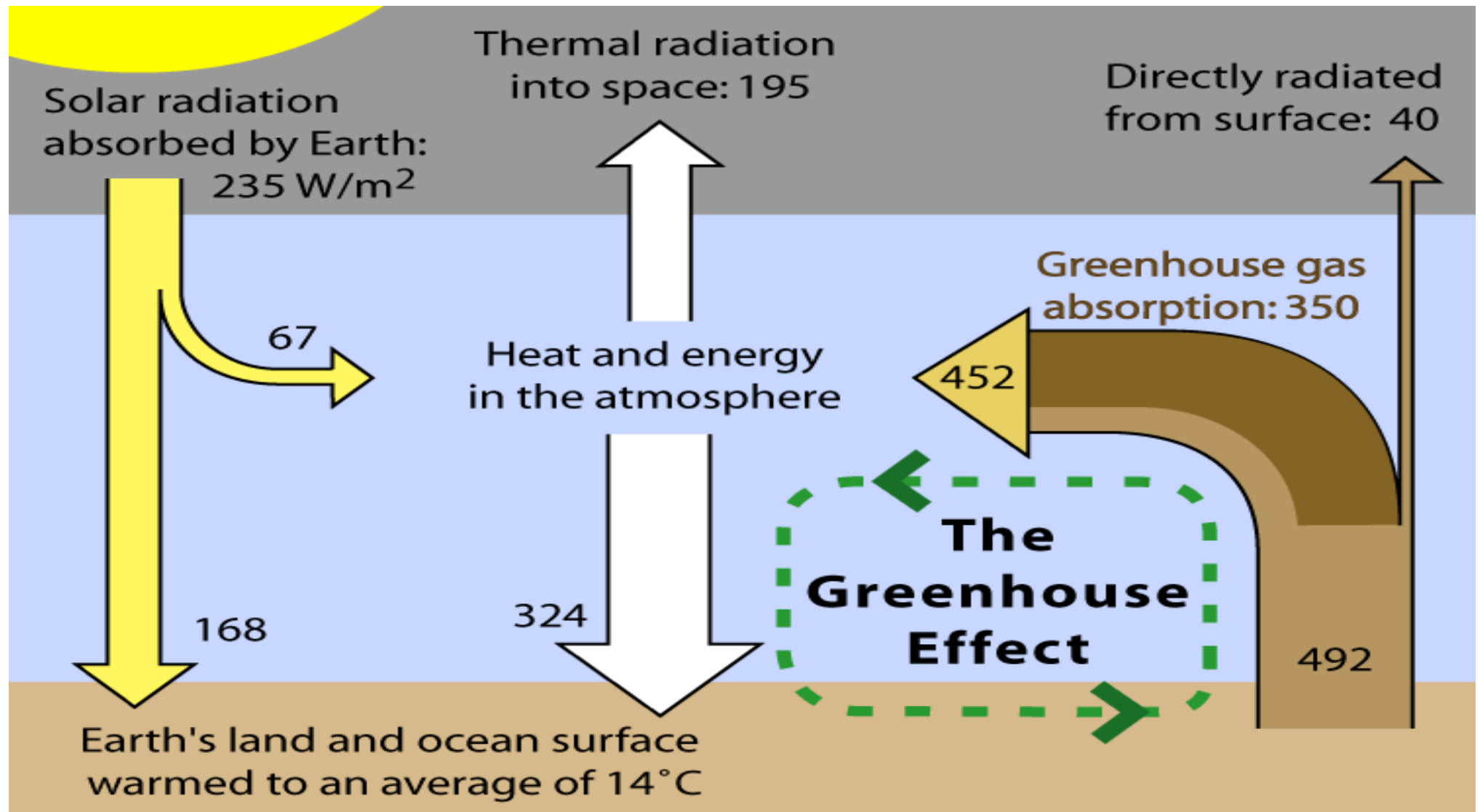


# OUR PROTECTED EARTH: Shields of Ozone, Atmosphere, Magnetic field



- Solar radiation establishes the Thermal Structure of the earth and its atmosphere. The total amount of radiation energy entering the earth system is balanced exactly by the amount being radiated into space until last few years upsetting the balance

# GREENHOUSE EFFECT - By Sun, Earth, & Atmosphere



- Sunlight:  $1366 \text{ W/m}^2$  on atmospheric surface - but  $235 \text{ W/m}^2$  is absorbed,  $67 \text{ W/m}^2$  by air and  $168 \text{ W/m}^2$  by land & water
- However, the energy cycle between the atmosphere and the earth with the incoming radiation keeps the temperature stable for us
- Total energy of  $492 \text{ W/m}^2$  [=  $168$ (sunlight) and  $324$  (atmosphere)] raises earth surface temperature to  $+14 \text{ C}$



## EFFECTS OF GLOBAL WARMING

i) Glaciers melting has doubled, ii) Sea level rising 0.8mm/year – rise > 20 cm by 2100 (IPCC), iii) Brown cloud and thick haze



# EFFECTS OF GLOBAL WARMING

iii) Brown cloud and thick haze - in humid condition & in winter Monsoon with no rainfall to wash the pollution



## Study in STEM subjects: Different from others

- General assumption: Science is not easy  
We know "Nothing worth comes easy"
- STEM need concentration and perseverance
- Our book says: Make effort - get one credit, Achieve Success - get two credits
- We need to face the challenge - hit the boundary of our talent and power
- Concern of parents - explain logically. They will understand



## ISMWS

- Being a scientist is very much rewarding. It gives the freedom to think and experience the adventure of finding solutions to challenges. Research gives the joy of getting something new and something useful, and publishing the results in scientific journals means contributing to advancement. When I deliver a scientific presentation, I don't think about me as a woman, I think about my research that is engaging to other scientists.
- Family is very important for us. Taking care of a human being is far more difficult job than anything else, because each human mind thinks independently and hence can always oppose to what you think. Taking care of a family can be most challenging and also be the most rewarding. However, each of us need to nurture and utilize our intellectual power. We need support and time to detach. Detachment is needed for any thoughtful work.

- We must adopt to ignore hostile and non-supportive comments, and put downs by fellow students, friends, and others. As my father said that it is important to "Remain focused to your goal, and do not get distracted by the minor problems. They become insignificant with achievement."
- Make a practice: "I will keep at least two hours every day for my science regardless what part of the day"
  - Average: 8 hours of sleep and rest, 8 hours for various chores, use 2 hours of science out of this 8 hours.
- Get part of any useful society, organization. You may find many benefits from it



Invite to APS membership:

## **AMERICAN PHYSICAL SOCIETY**

Membership (free for 4 - 6 years) info:

Contact: Sultana Nahar

Email: [nahar.1@osu.edu](mailto:nahar.1@osu.edu)

Website for details:

<http://www.astronomy.ohio-state.edu/~nahar/fip.html>

After becoming member (will receive ID from APS),

- Get your web account using your account
- become a member of your division & of APS unit - FIP:  
Forum of International Physics

- Post your resume
- Sign up for job alerts and apply online
- Submit abstracts for APS conferences
- Check many other activities and benefits, such as,  
free issues of Physics today, newsletters, calendar, research  
alters, application notices for various recognition