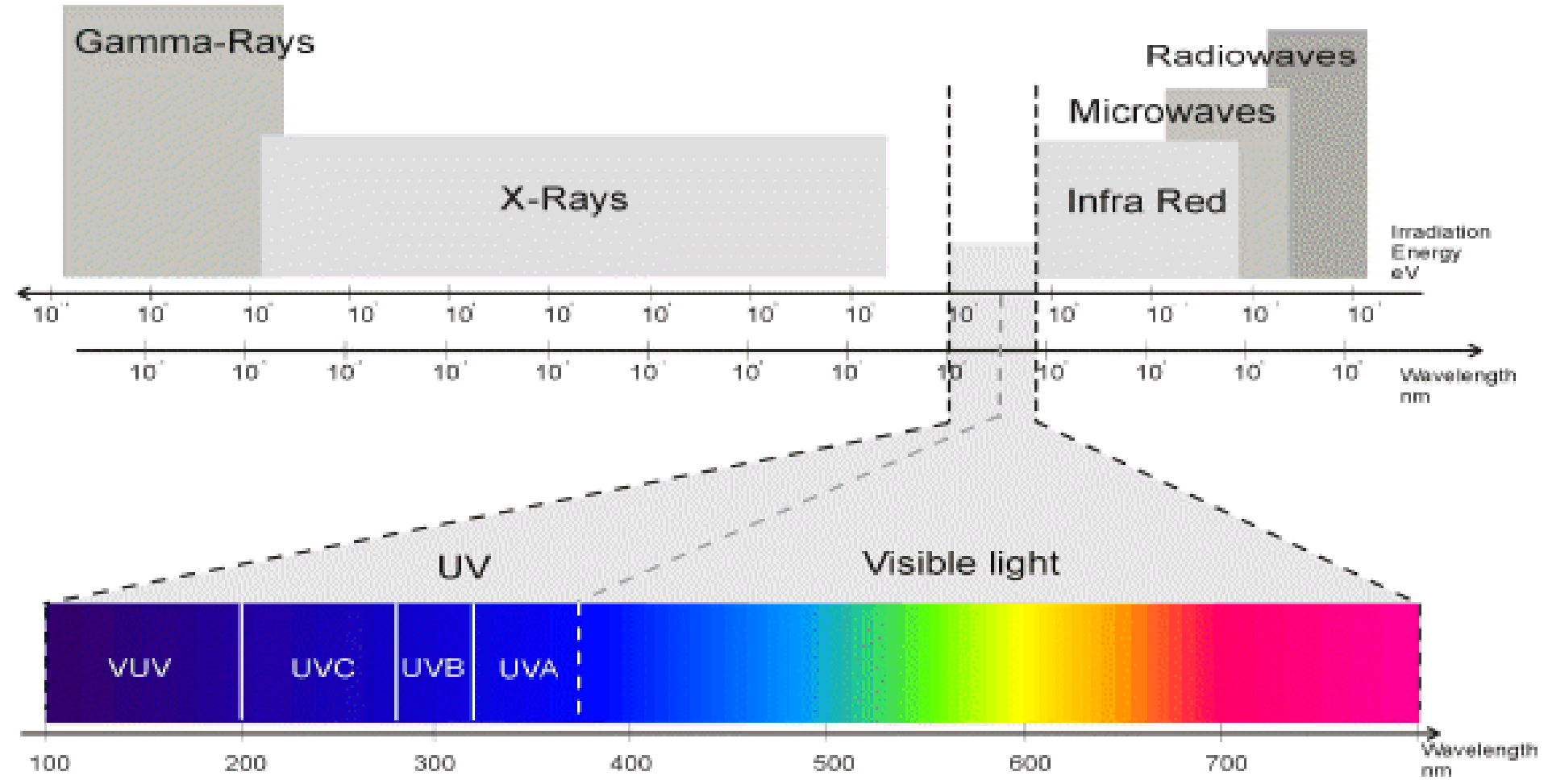
Vacuum ultraviolet light

UV light (ISO-DIS-21348)

Name	Abbreviation	Wavelength range in nanometers	Energy per photon
Ultraviolet A, long wave, or black light	UVA	400 nm–320 nm	3.10–3.94 eV
Near	NUV	400 nm–300 nm	3.10–4.13 eV
Ultraviolet B or medium wave	UVB	320 nm–280 nm	3.94–4.43 eV
Middle	MUV	300 nm–200 nm	4.13–6.20 eV
Ultraviolet C, short wave, or germicidal	UVC	280 nm–100 nm	4.43–12.4 eV
Far	FUV	200 nm–122 nm	6.20–10.2 eV
Vacuum	VUV	200 nm–10 nm	6.20–124 eV
Extreme	EUV	121 nm–10 nm	10.2–124 eV


Gamma-Rays
X-Rays
Radiowaves
Microwaves
Infra Red
Irradiation
Energy
eV
Wavelength
nm
UV
Visible light
VUV
UVC
UVB
UVA
100
200
300
400
500
600
700
Wavelength
nm

UVA

- UVA is the least harmful and most commonly found type of UV light, because it has the least energy. UVA light is often called black light, and is used for its relative harmlessness and its ability to cause fluorescent materials to emit visible light - thus appearing to glow in the dark. Most phototherapy and tanning booths use UVA lamps.

UVB

- UVB is typically the most destructive form of UV light, because it has enough energy to damage biological tissues, yet not quite enough to be completely absorbed by the atmosphere. UVB is known to cause skin cancer. Since most of the extraterrestrial UVB light is blocked by the atmosphere, a small change in the ozone layer could dramatically increase the danger of skin cancer.

UVC

- UVC is almost completely absorbed in air within a few hundred meters. When UVC photons collide with oxygen atoms, the energy exchange causes the formation of ozone. UVC is almost never observed in nature, since it is absorbed so quickly. Germicidal UVC lamps are often used to purify air and water, because of their ability to kill bacteria.

VUV

- **"Vacuum UV"** is so named because it is absorbed strongly by air and is therefore used in a vacuum. In the long-wave limit of this region, roughly 150–200 nm, the principal absorber is the oxygen in air. Work in this region can be performed in an oxygen free atmosphere, pure nitrogen being commonly used, which avoids the need for a vacuum chamber.

Detecting and measuring UV radiation

- Between 200-400nm, a variety of detector options exist.
- Vacuum UV

Technology for VUV instrumentation has been largely driven by solar physics for many decades and more recently some lithographic applications. While optics can be used to remove unwanted visible light that contaminates the VUV, generally detectors can be limited by their response to non-VUV radiation and the development of "solar-blind" devices has been an important area of research. Wide-gap solid state devices or vacuum devices with high cutoff photocathodes can be attractive compared to silicon diodes. Recently a diamond based device flew on the LYRA (Marchywka Effect).

Ultraviolet photography

- Reflected UV photography

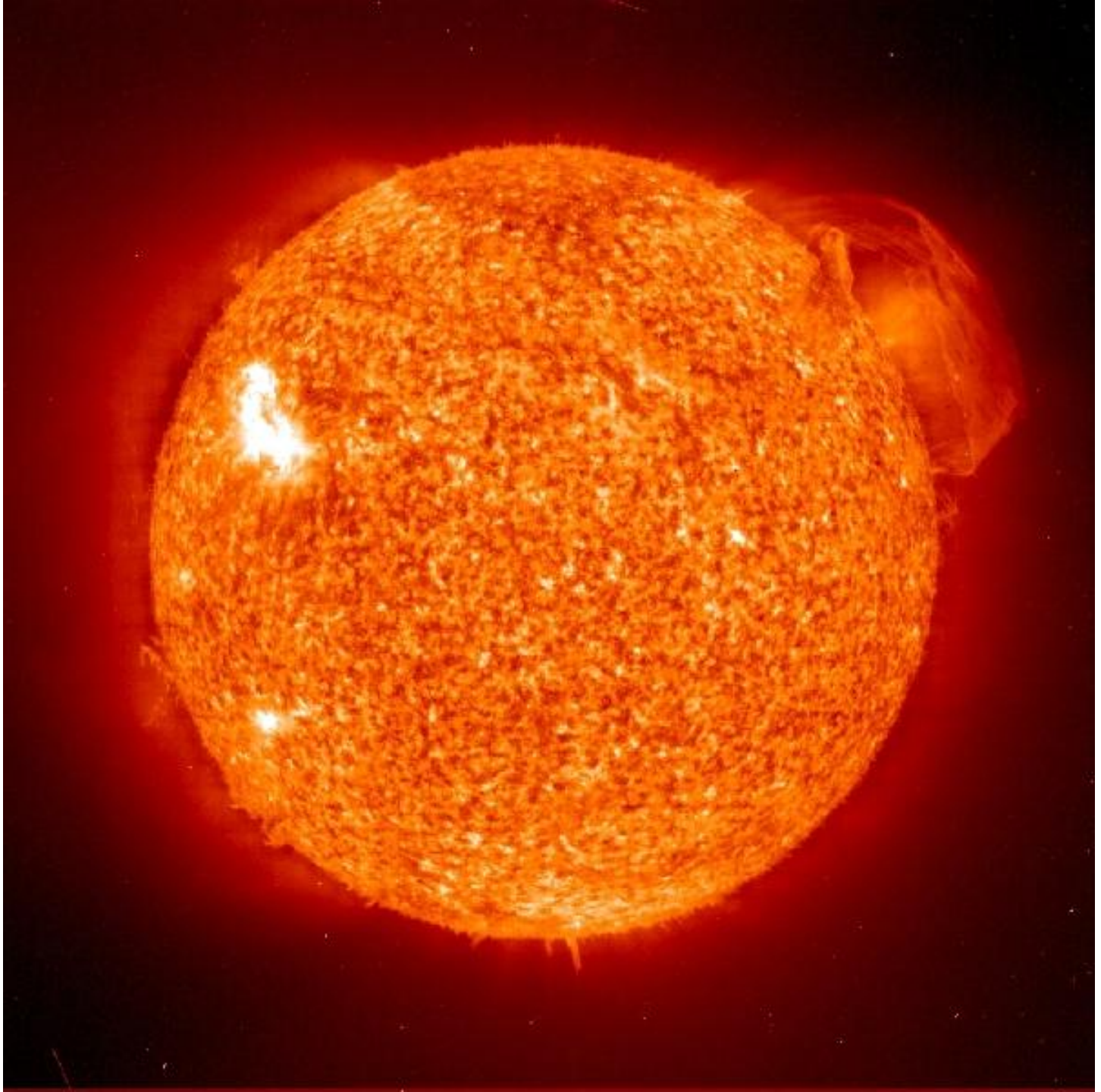
A UV transmitting, visible light blocking filter is placed on the lens, that allows ultraviolet to pass and absorbs all visible light.

- Ultraviolet fluorescence photography

Fluorescent materials lit by UV light. No filter is used to absorb violet visible light. Photography based on (visible) fluorescence induced by UV radiation has better results in archaeological photography.

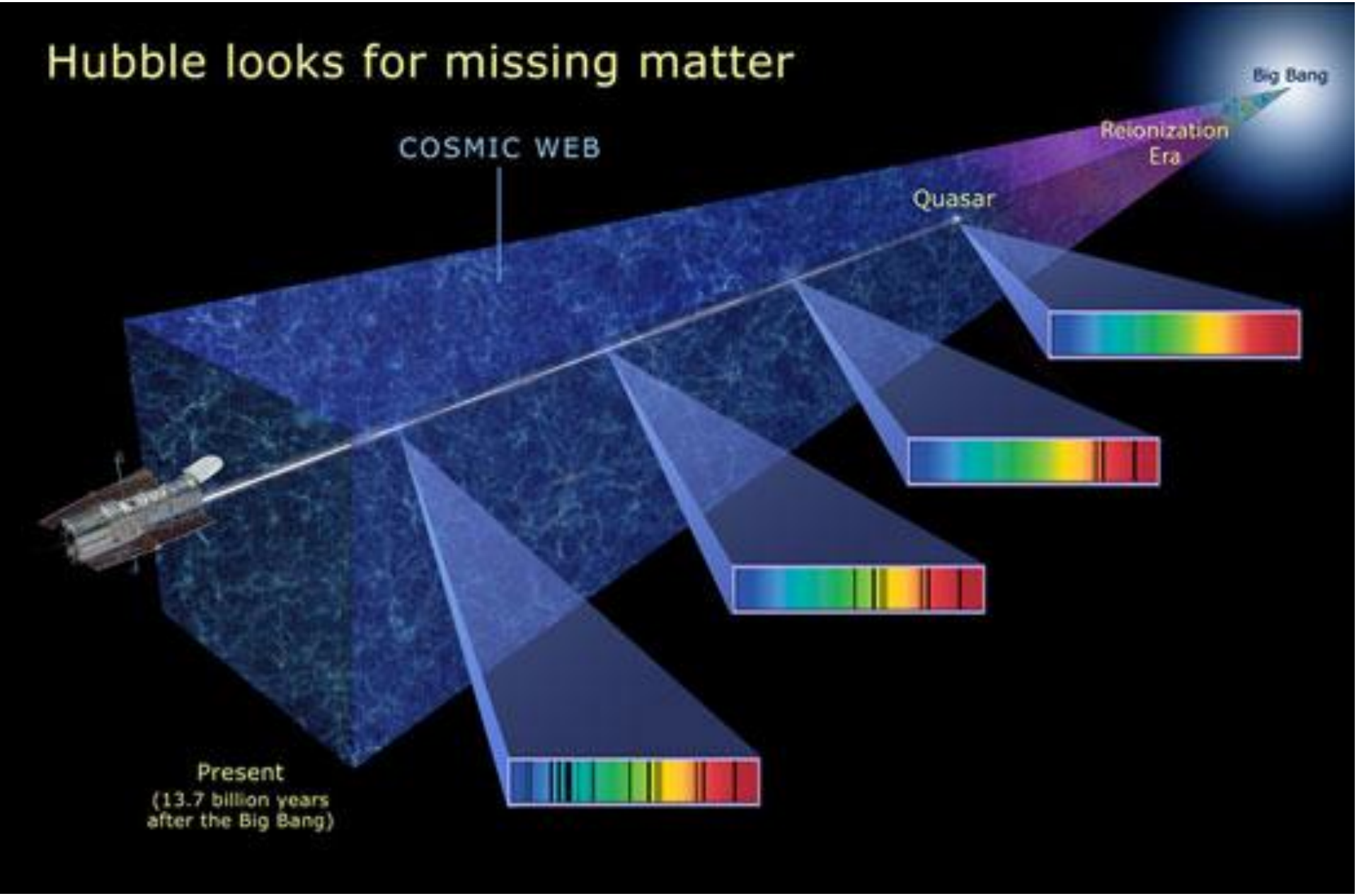
Extreme ultraviolet Imaging Telescope (EIT)

- The **EIT** is an instrument on the *Solar and Heliospheric Observatory* spacecraft used to obtain high-resolution images of the solar corona in the ultraviolet range. The EIT instrument is sensitive to light of four different wavelengths: 17.1, 19.5, 28.4, and 30.4 nm, corresponding to light produced by highly ionized iron (XI)/(X), (XII), (XV), and helium (II), respectively. EIT is built as a single telescope with a quadrant structure to the entrance mirrors: each quadrant reflects a different color of EUV light, and the wavelength to be observed is selected by a shutter that blocks light from all but the desired quadrant of the main telescope.



The Cosmic Origins Spectrograph (COS)

- **The COS** is a science instrument that was installed on the Hubble Space Telescope during Servicing Mission 4 (STS-125) in May 2009. It is designed for ultraviolet (115-320 nm) spectroscopy of faint point sources with a resolving power of ≈1,550 to 24,000. Science goals include the study of the origins of large scale structure in the universe, the formation and evolution of galaxies, and the origin of stellar and planetary systems and the cold interstellar medium. COS was developed and built by the Center for Astrophysics and Space Astronomy (CASA-ARL) at the University of Colorado at Boulder and the Ball Aerospace and Technologies Corporation in Boulder, Colorado.


Hubble looks for missing matter
Big Bang
Reionization Era
COSMIC WEB
Quasar
Present
(13.7 billion years after the Big Bang)