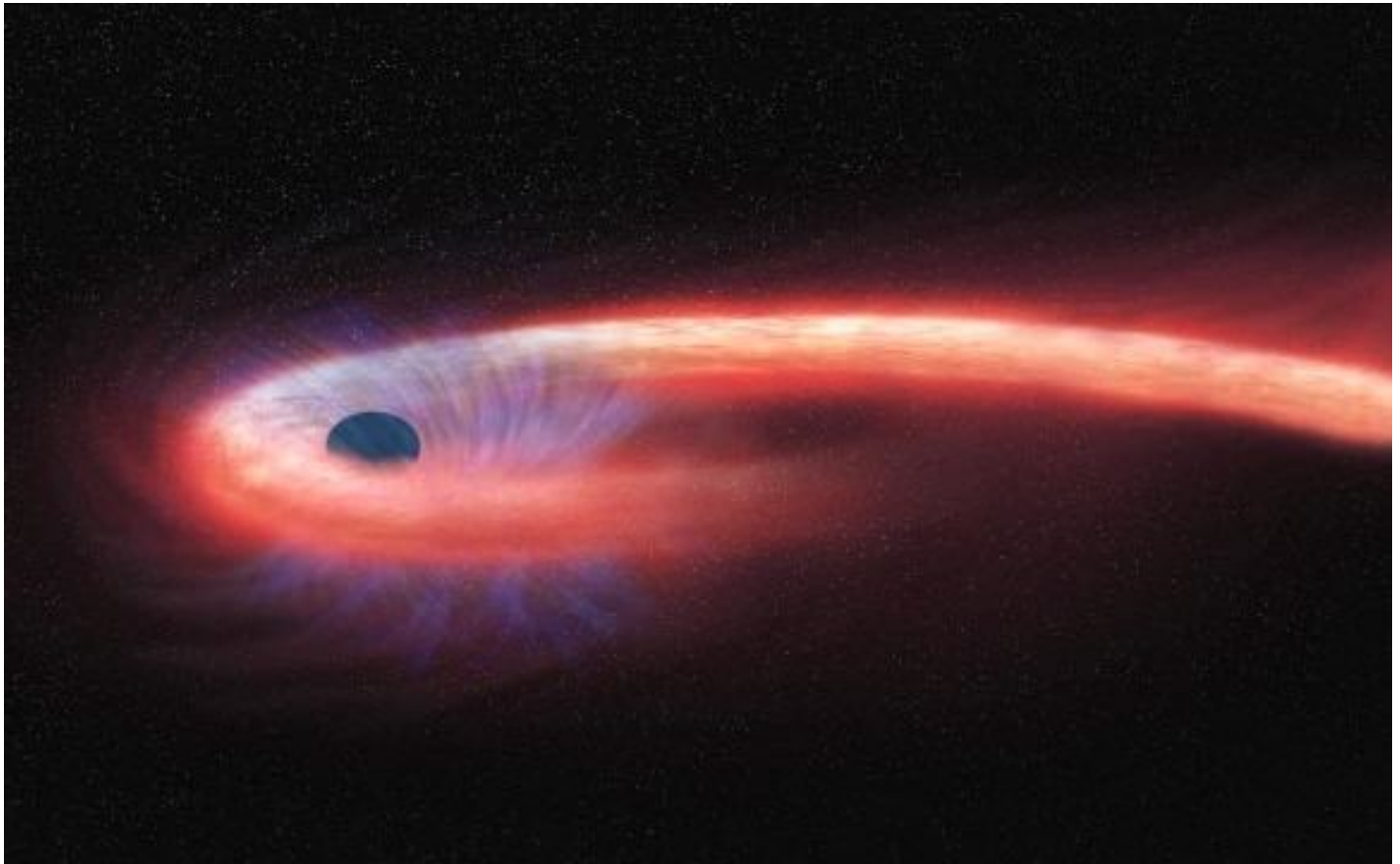


What is a Tidal Disruption Event (TDE)?

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About Tidal Disruption Event (TDE)

- TDE is a phenomenon in astronomy that **occurs when a star passes too close to a supermassive black hole** or a massive stellar-mass black hole.
- The **intense gravitational forces from the black hole cause tidal forces** that **can tear the star apart**. This process **is also known as “tidal disruption.”**
- **How does a TDE typically unfold?**
 - **Close Approach:** A star in a galaxy **approaches a black hole on a very close trajectory** due to gravitational interactions within the galaxy.
 - **Tidal Forces:** As the star gets closer to the black hole, the **gravitational forces acting on it become increasingly uneven** due to the difference in gravitational pull on the near side and far side of the star. **These tidal forces can be strong enough to disrupt the star.**
 - **Stellar Disruption:** When the tidal forces exceed the self-gravitational forces holding the star together, it undergoes a process called **“tidal disruption.”** The star is stretched and **eventually torn apart** into a stream of gas and debris.

- **Accretion Disk Formation:** The debris from the disrupted star **forms an accretion disk around the black hole**. This disk is **composed of hot gas and dust**, and it spirals inwards towards the black hole.
- **Energy Release:** As the material in the accretion disk spirals inwards, it **releases a tremendous amount of energy in the form of X-rays and ultraviolet radiation**.
- **Flares and Observations:** TDEs are often observed as bright flares of radiation from the center of a galaxy. These flares **can last for several months to years, gradually fading** as the disrupted star's material is consumed by the black hole.

What is a Blackhole?

- A black hole is a **place in space where gravity pulls so much that even light cannot get out**. The **gravity is so strong because matter has been squeezed into a tiny space**.
- This **can happen when a star is dying**.
- Because no light can get out, **people can't see black holes. They are invisible**. Space telescopes with special tools can help find black holes.
- **Event Horizon:** The event horizon is the **boundary around a black hole beyond which nothing can escape**, not even light. It marks the point of no return. Anything that crosses this boundary is inevitably drawn into the black hole.
- **Supermassive Black Holes:** These are **found at the centers of most galaxies and have masses ranging from millions to billions of times that of our Sun**.

Q1) What is ultraviolet radiation (UV)?

Ultraviolet (UV) radiation is a type of electromagnetic radiation with wavelengths shorter than those of visible light but longer than X-rays. It falls within the electromagnetic spectrum between X-rays and visible light. UV radiation is produced by the sun, as well as by certain artificial sources such as UV lamps and lasers.

Source: [Supermassive black hole gives astronomers a glimpse of star's innards after a messy feast](#)

Source: <https://vajiramandravi.com/current-affairs/what-is-a-tidal-disruption-event-tde/>

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