

Tidal disruption event or destruction of a star by a black hole

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In news— Telescopes operated by National Aeronautics and Space Administration (NASA) recently observed a massive black hole devouring a star.

What is Tidal disruption event?

- The **astronomical phenomenon of the destruction of a star by a black hole** is formally called a tidal disruption event (TDE).
- A **tidal force is the difference in the strength of gravity between two points**. If the tidal force exerted on a body is greater than the intermolecular force that keeps it together, the body will get disrupted.
- **During a TDE, the tidal force of a black hole disrupts the star in vicinity**. While about half of the star's debris continues on its original path, the other half is attracted by the black hole's gravitational pull.
- The gradual growth of this material bound to the black hole **produces a short-lived flare of emission**, known as a tidal disruption event.
- **The incident was the fifth-closest example of a black hole destroying a star** and occurred 250 million light-years from the earth, in the centre of another galaxy.
- In the recently-observed example, **a dramatic rise in high-energy X-ray light around the black hole was seen once the star was completely ruptured by the black hole's gravity**.
- **This indicated the formation of an extremely hot structure above the black hole called a corona**. According to the study, the proximity of the

aforementioned TDE provided a spectacular view of the corona's formation and evaluation.

- **The event is formally called AT2021ehb, and took place in a galaxy** with a central black hole about 10 million times the mass of our sun.
- It was first spotted on March 1, 2021, by the Zwicky Transient Facility in Southern California.
- Around 300 days later, the **Nuclear Spectroscopic Telescopic Array (NuSTAR)** – NASA's most sensitive space telescope capable of observing high-energy X-rays – **began observing the system.**
- Scientists detected a corona, but they don't know where the plasma comes from or exactly how it gets so hot.
- Coronae usually appear with jets of gas that flow in the opposite direction from a black hole. However, with AT2021ehb, there were no jets.
- TDEs are attractive to astronomers because of their observability and short duration, and the opportunity to study the impact of black hole's gravity on materials around it.
- They are also an important tool to learn how black holes influence their environments.