New Surprises from Radio Observations of Tidal Disruption Event Outflows

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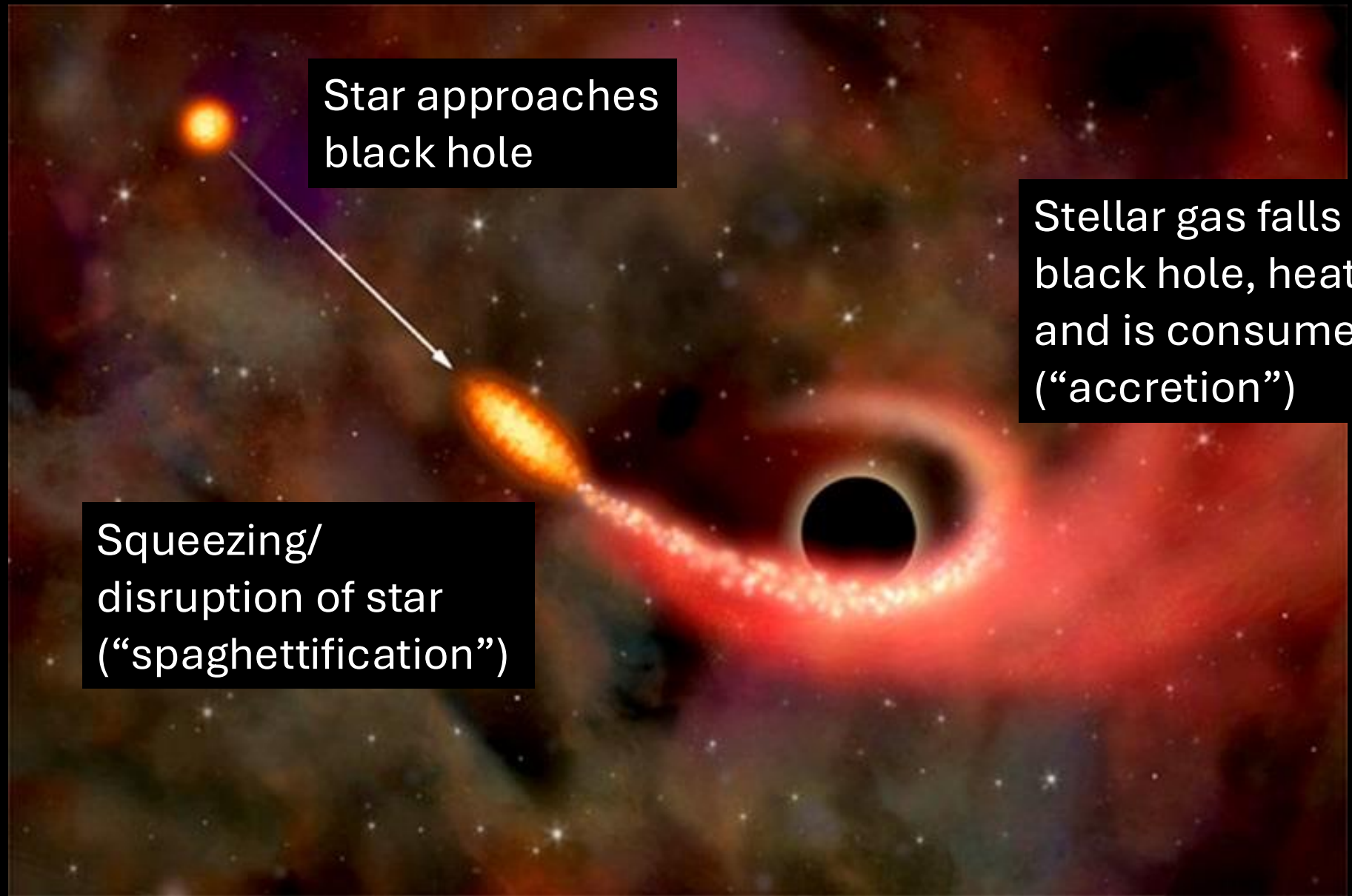
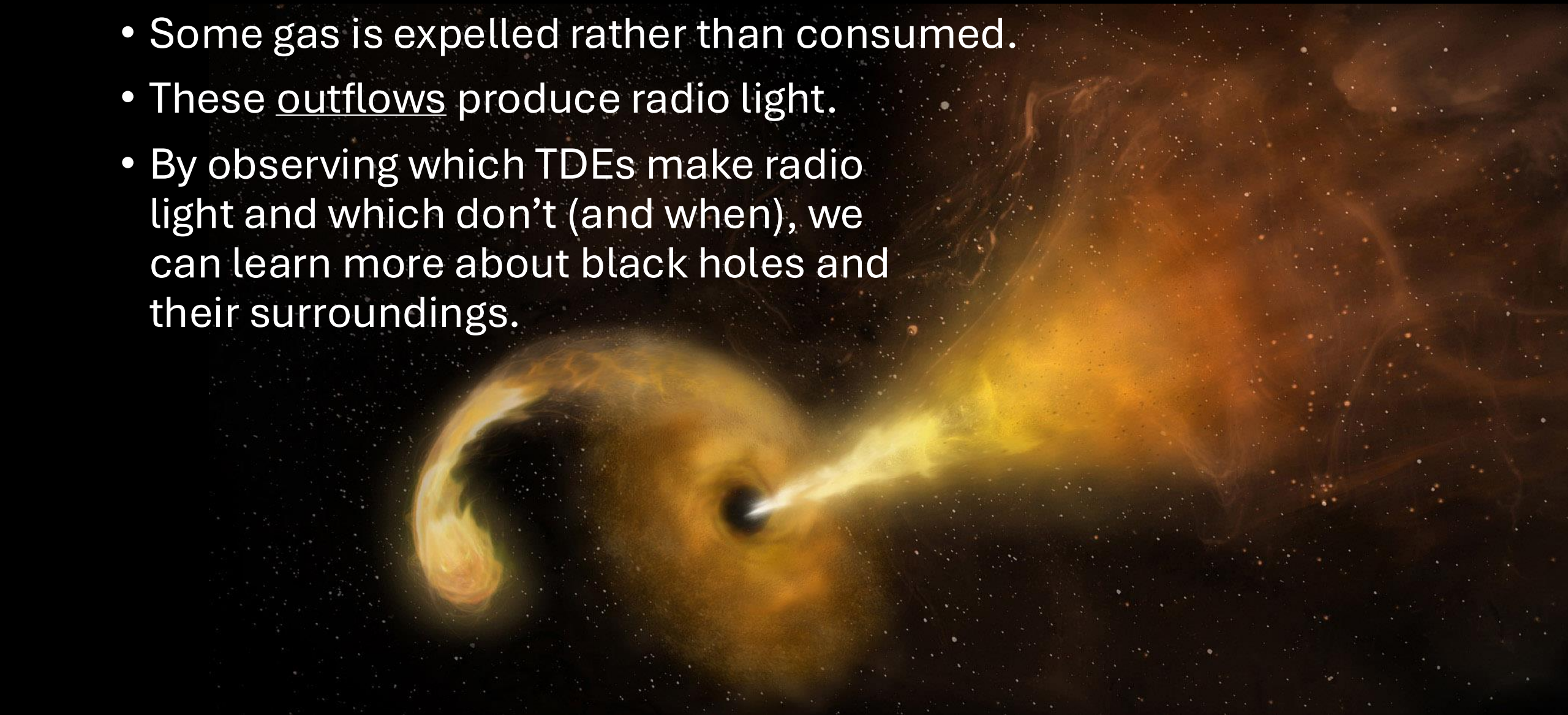
What is a Tidal Disruption Event? (TDE)



Black holes are messy eaters

- Some gas is expelled rather than consumed.
- These outflows produce radio light.
- By observing which TDEs make radio light and which don’t (and when), we can learn more about black holes and their surroundings.



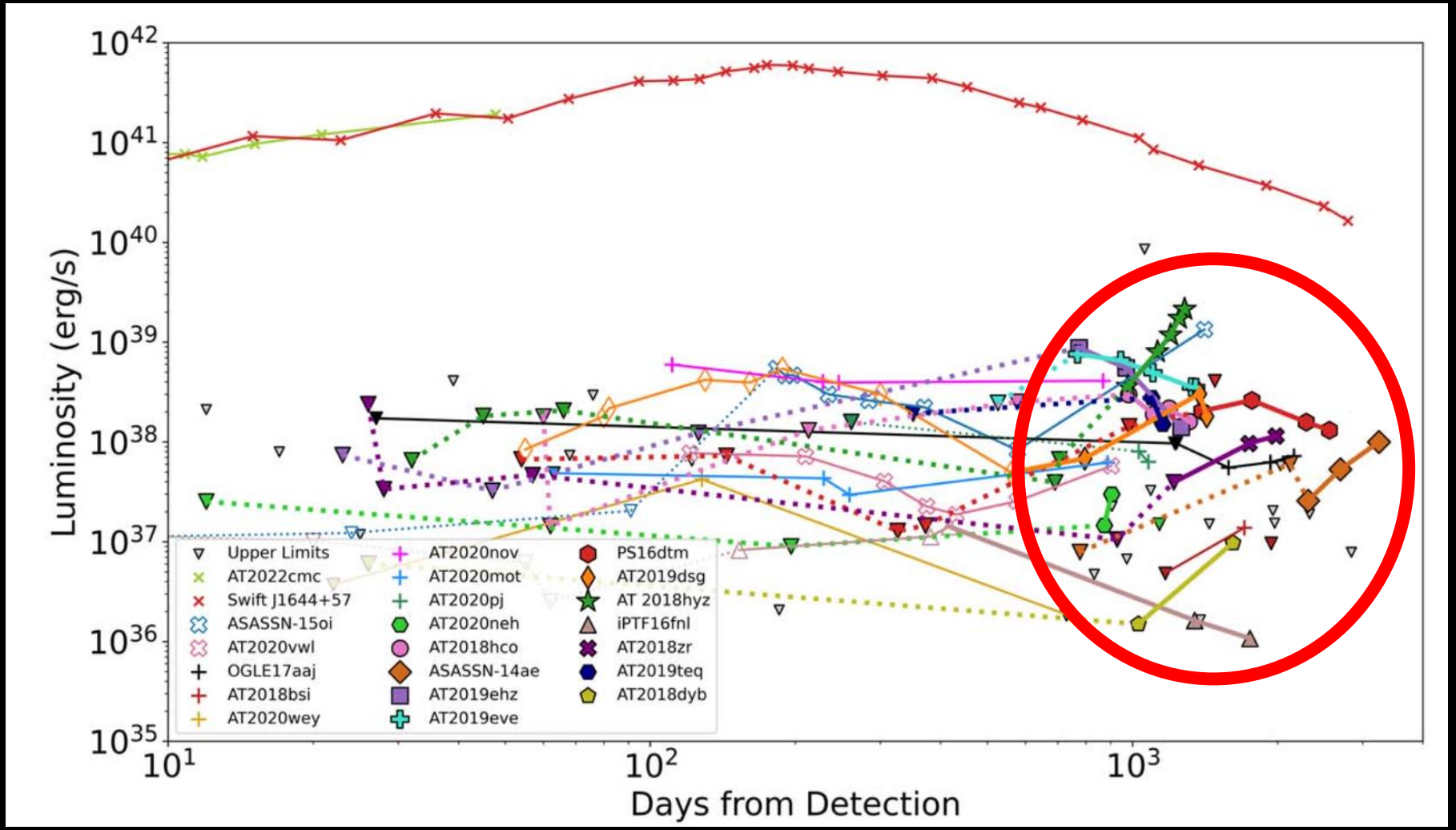
Building the first radio TDE sample

- We used the NSF Very Large Array (NSF VLA) to make the **first systematic radio observations** of nearby TDEs.

Surprise!

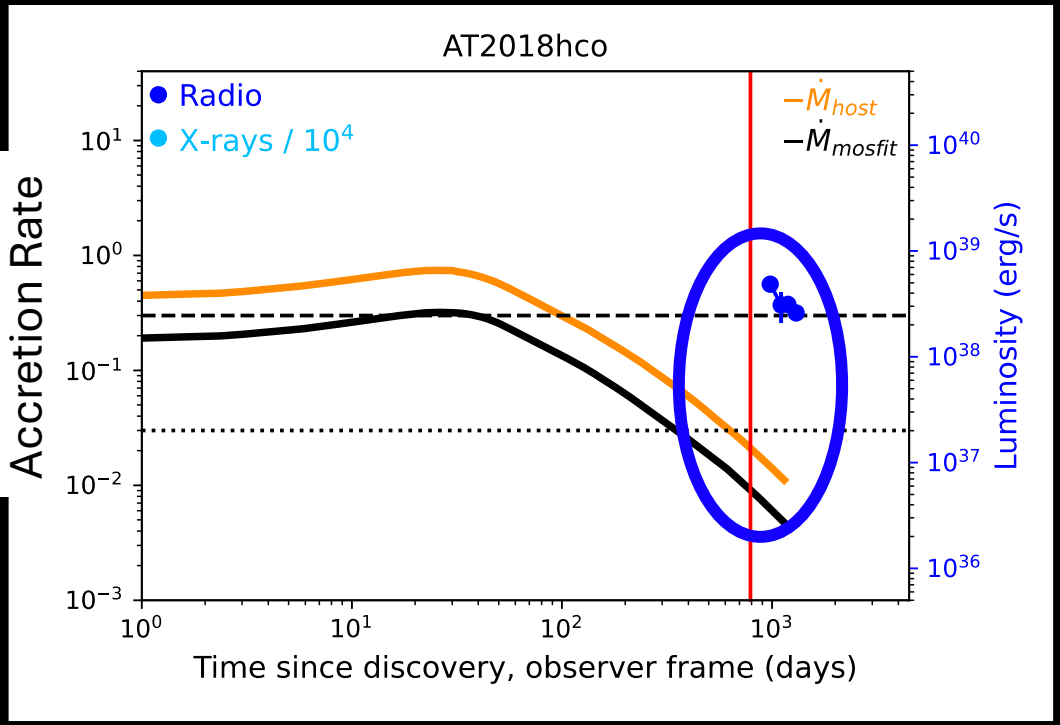
- TDEs can light up in radio **years** after the visible light fades! (Cendes et al. 2024)

- But why??



This work: radio + visible light + X-rays

- We measure the accretion rate versus time with visible and X-ray light.
- **Radio light** appears when the black hole is eating either very rapidly OR very slowly.
- Accretion operates similarly in the large ("supermassive") black holes that power TDEs and in smaller black holes in our galaxy.



Summary

- Many black holes unexpectedly linger over their stellar meals! And sometimes they get indigestion.
- The late-time radio “burps” in TDEs likely appear when the black hole is either eating very quicky or very slowly.
- We can also now predict which TDEs will show radio light at late times: early optical spectra of these TDEs often lack helium emission.

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