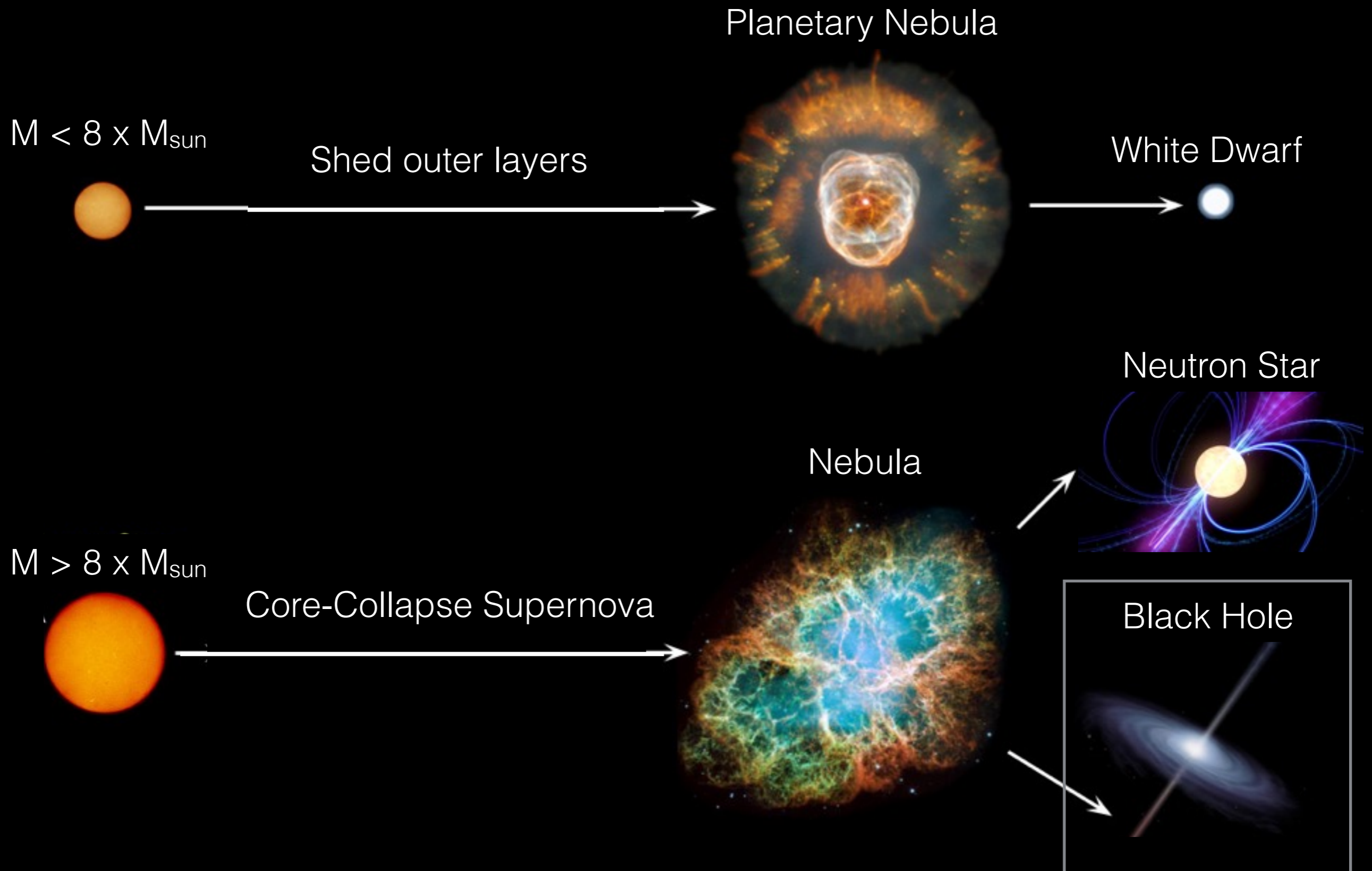


A Broader Landscape of Stellar Death

Anna Ho
ah@astro.caltech.edu



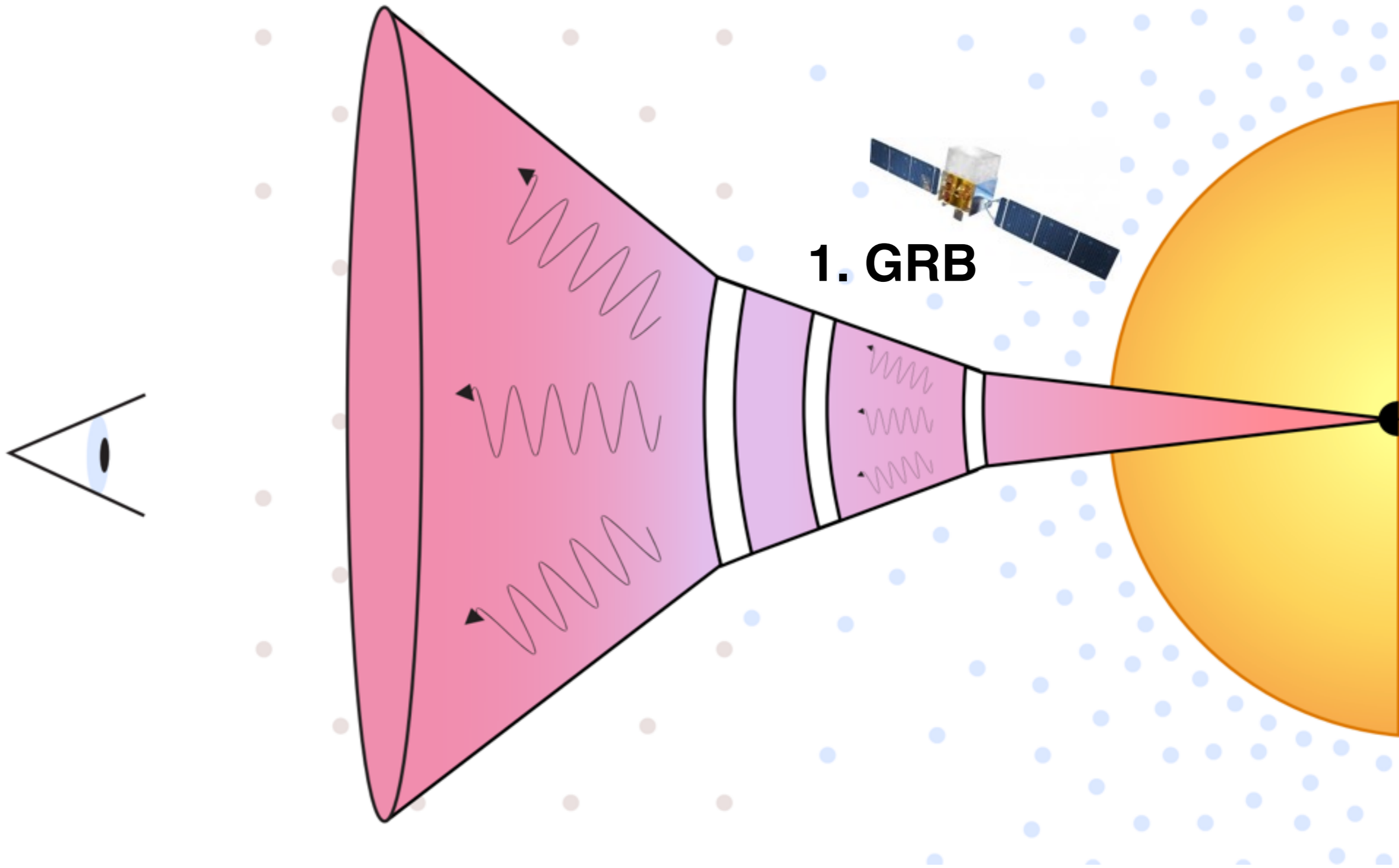
The fate of a star depends on its mass



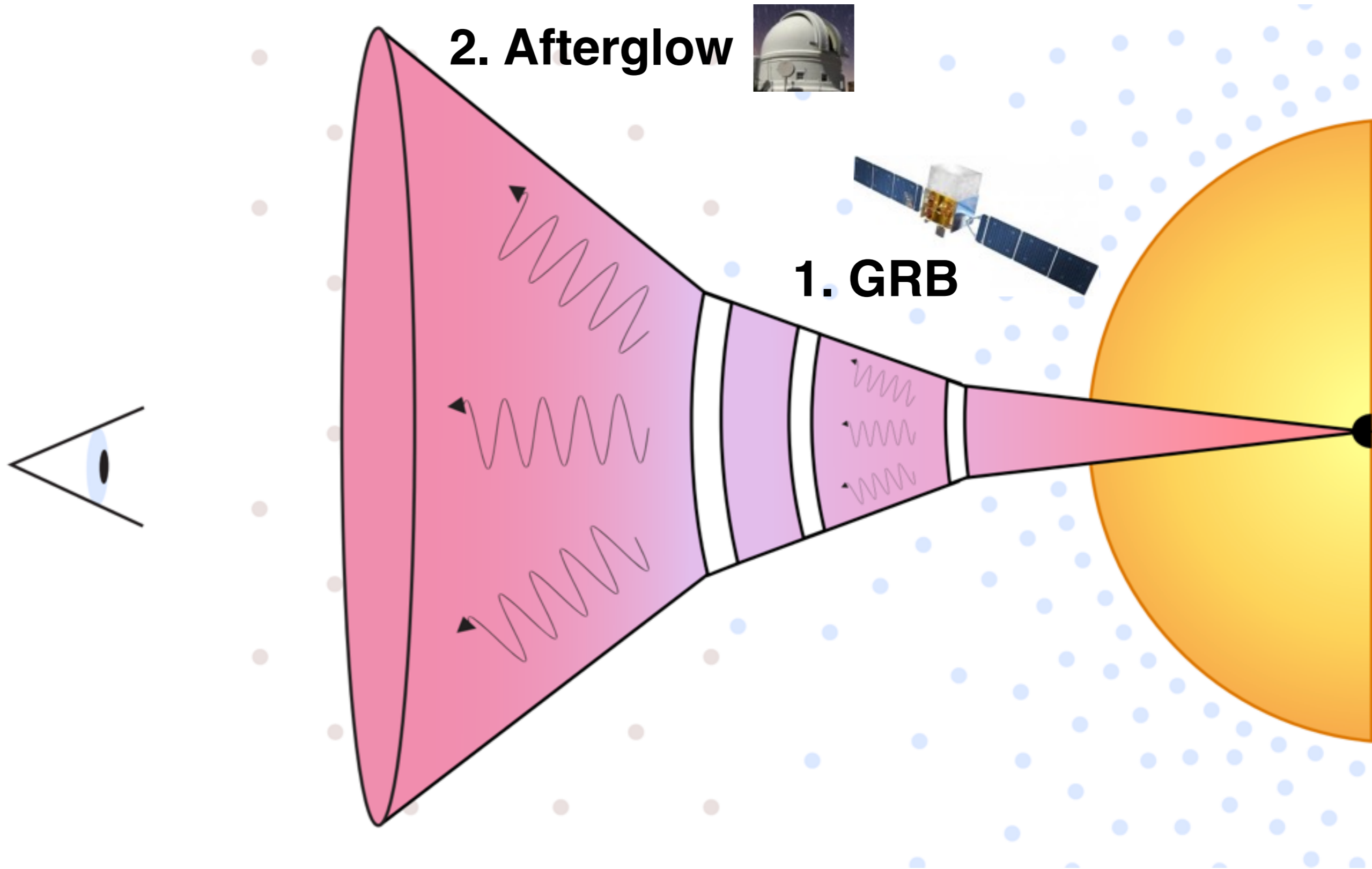
~1% of core collapse supernovae

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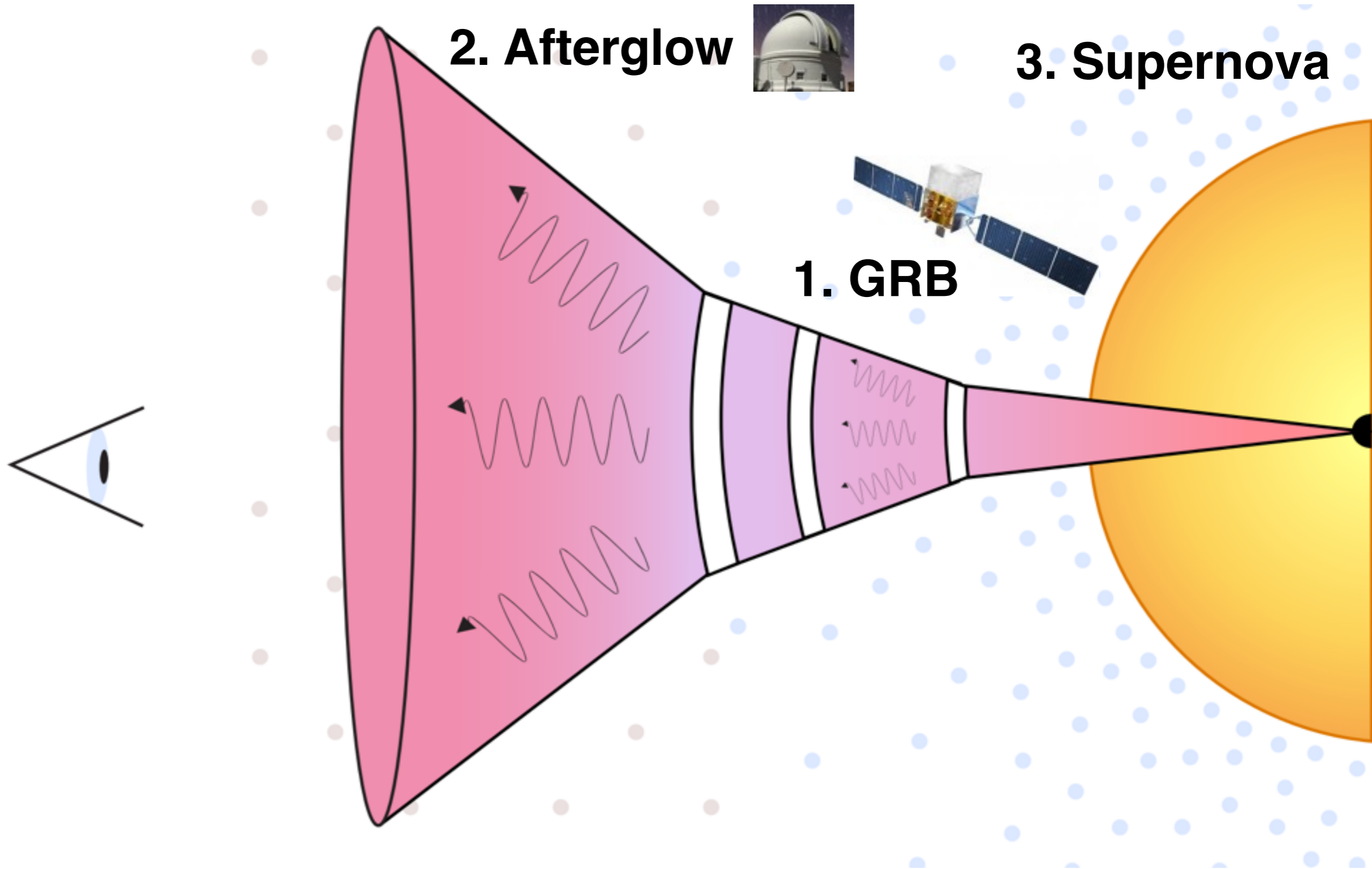
Gamma-Ray Bursts: “engine-driven” explosions



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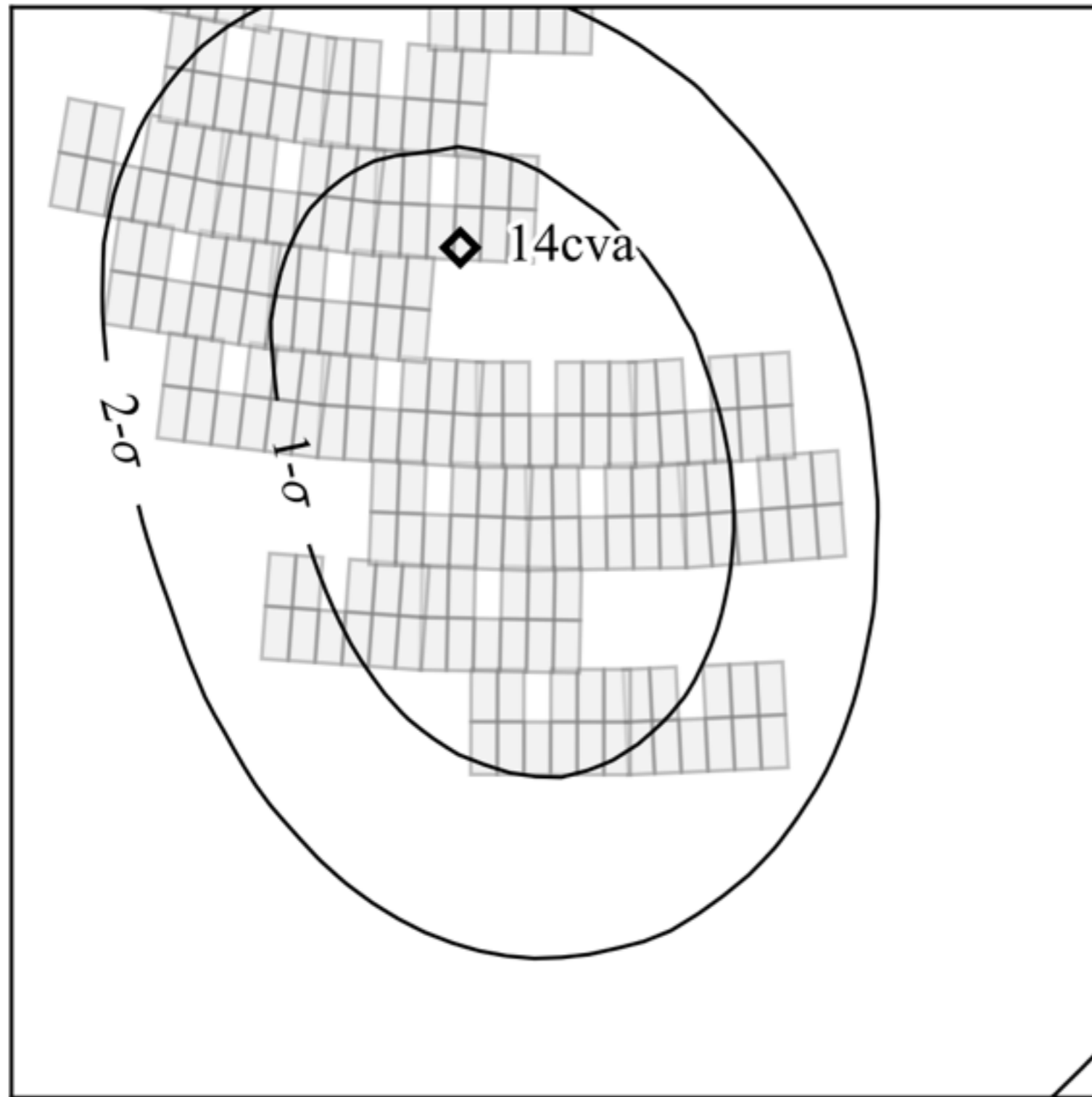


Gamma-Ray Bursts: “engine-driven” explosions

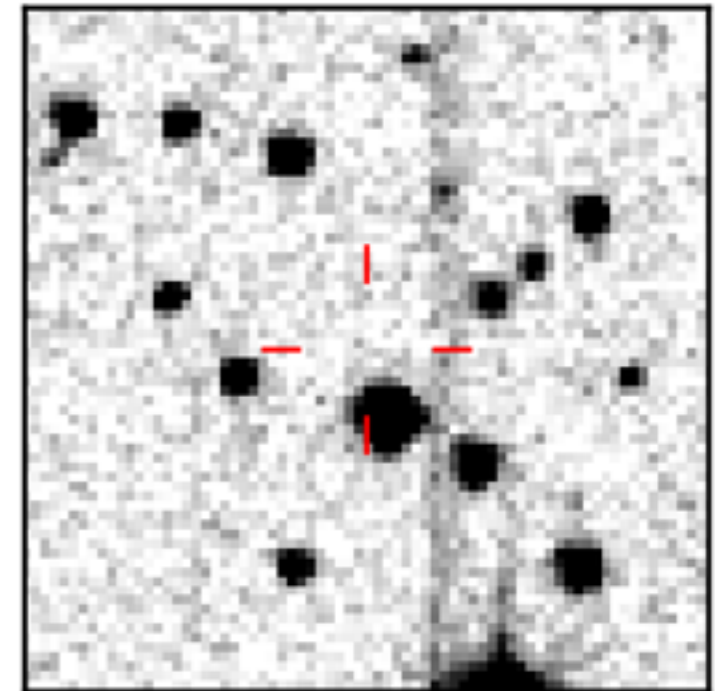


PTF Era: Following Up Gamma-Ray Bursts (GRBs)

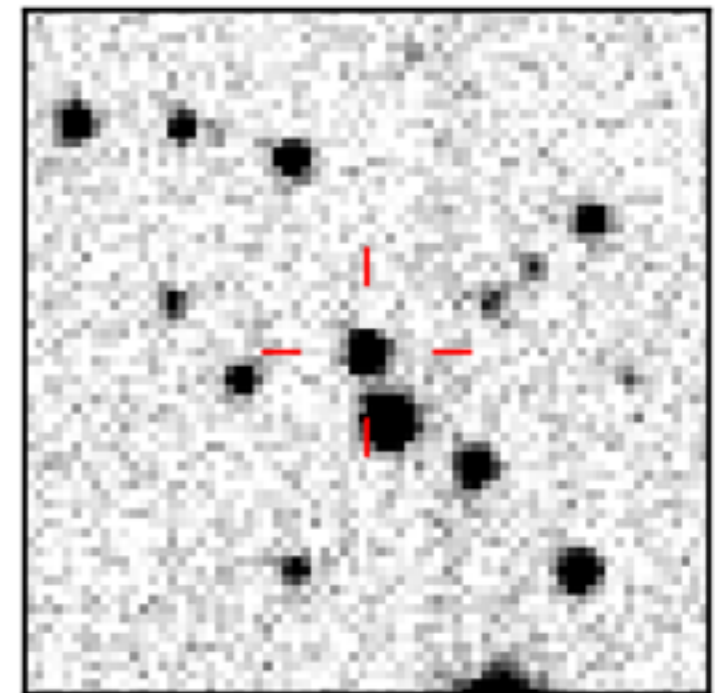
GRB 140620A / iPTF14cva



PTF Image, before



PTF Image, after



Open Questions

- what if the jet gets choked on its way out?
- what if the jet is pointed away from us?
- what about jets with different compositions?
- how often does a collapsing star form a jet?

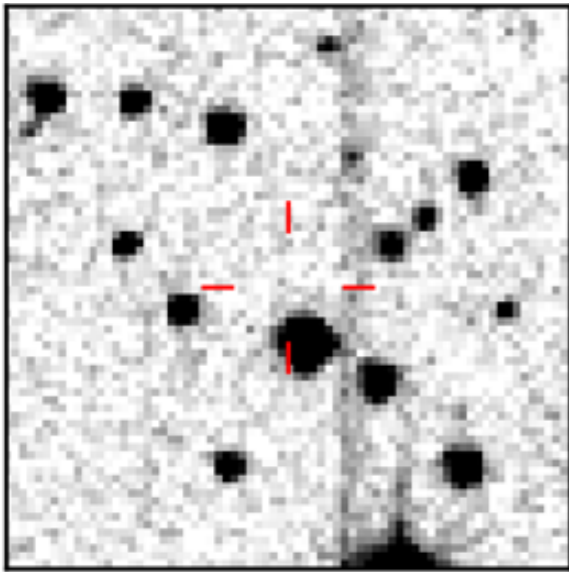
To answer these questions, we need to find engine-driven explosions without a GRB!

ZTF was explicitly designed to pursue engine-driven explosions

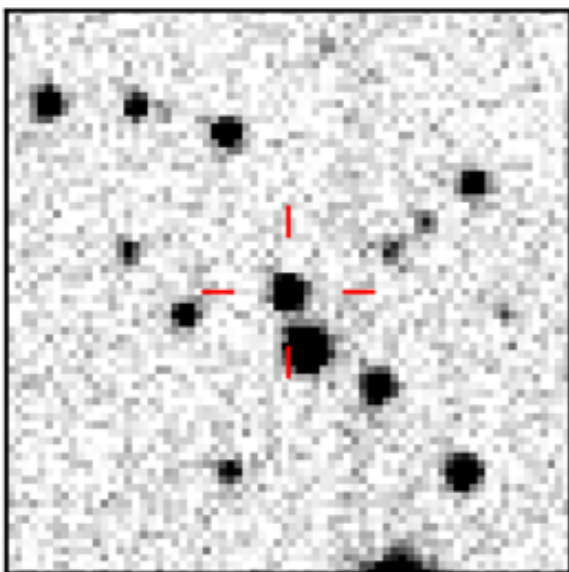
Discovery process

Step 1: Recognition

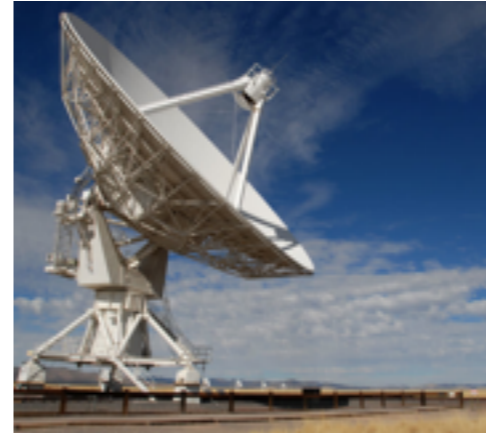
ZTF Image, before



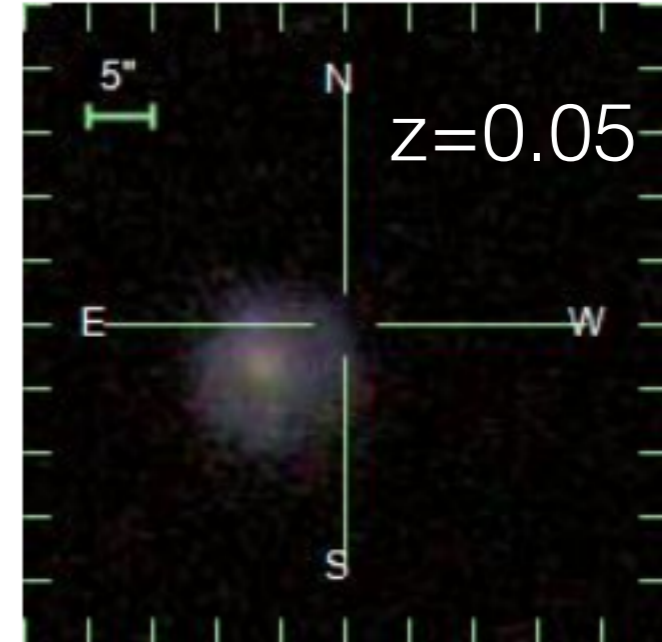
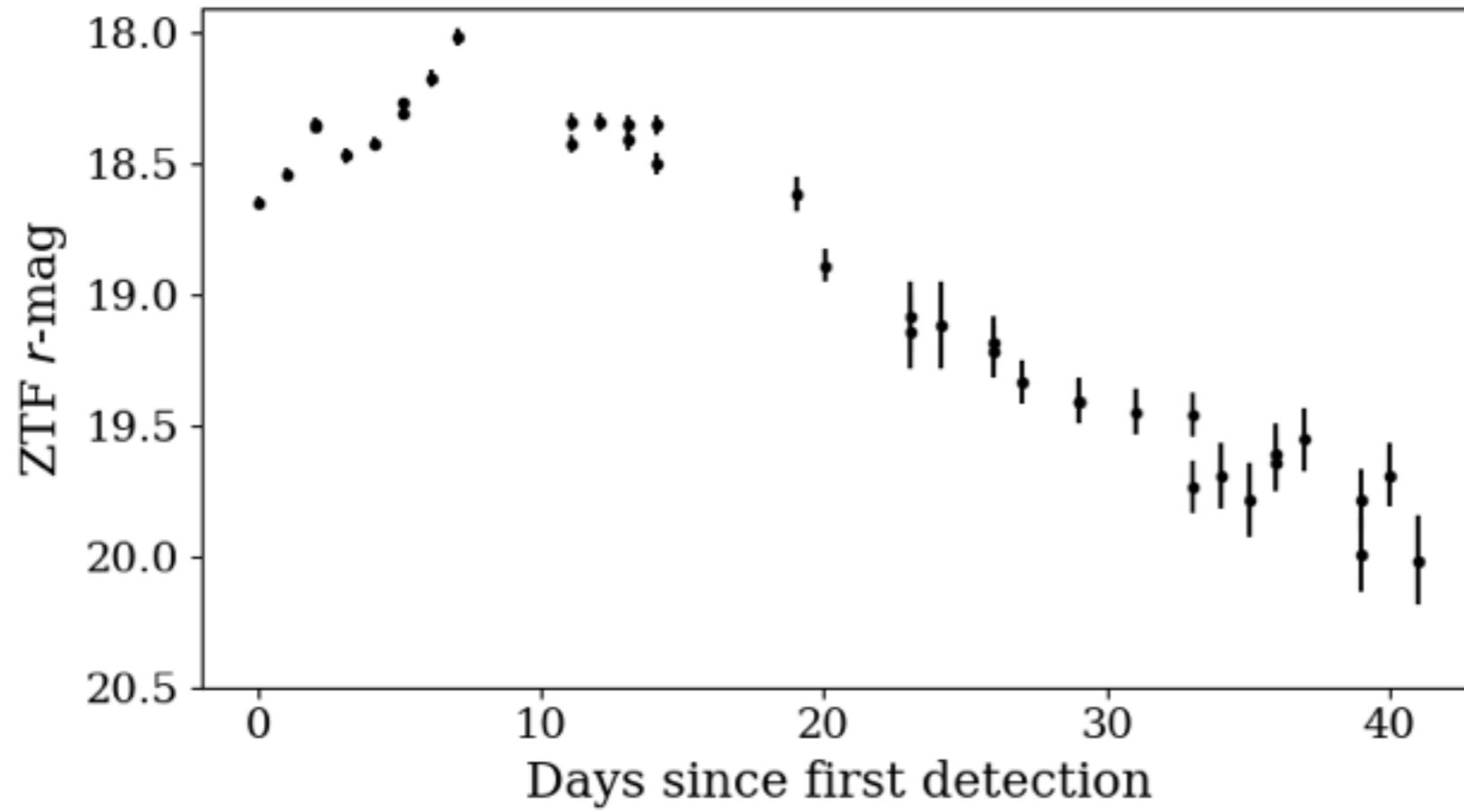
ZTF Image, after



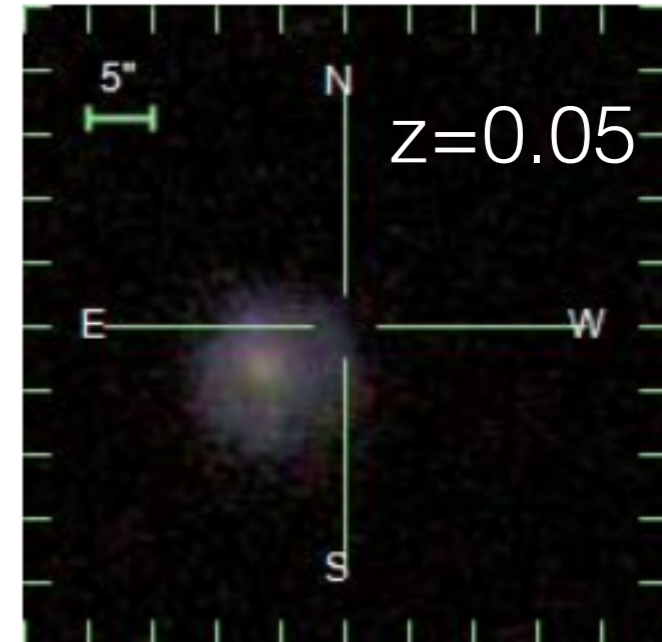
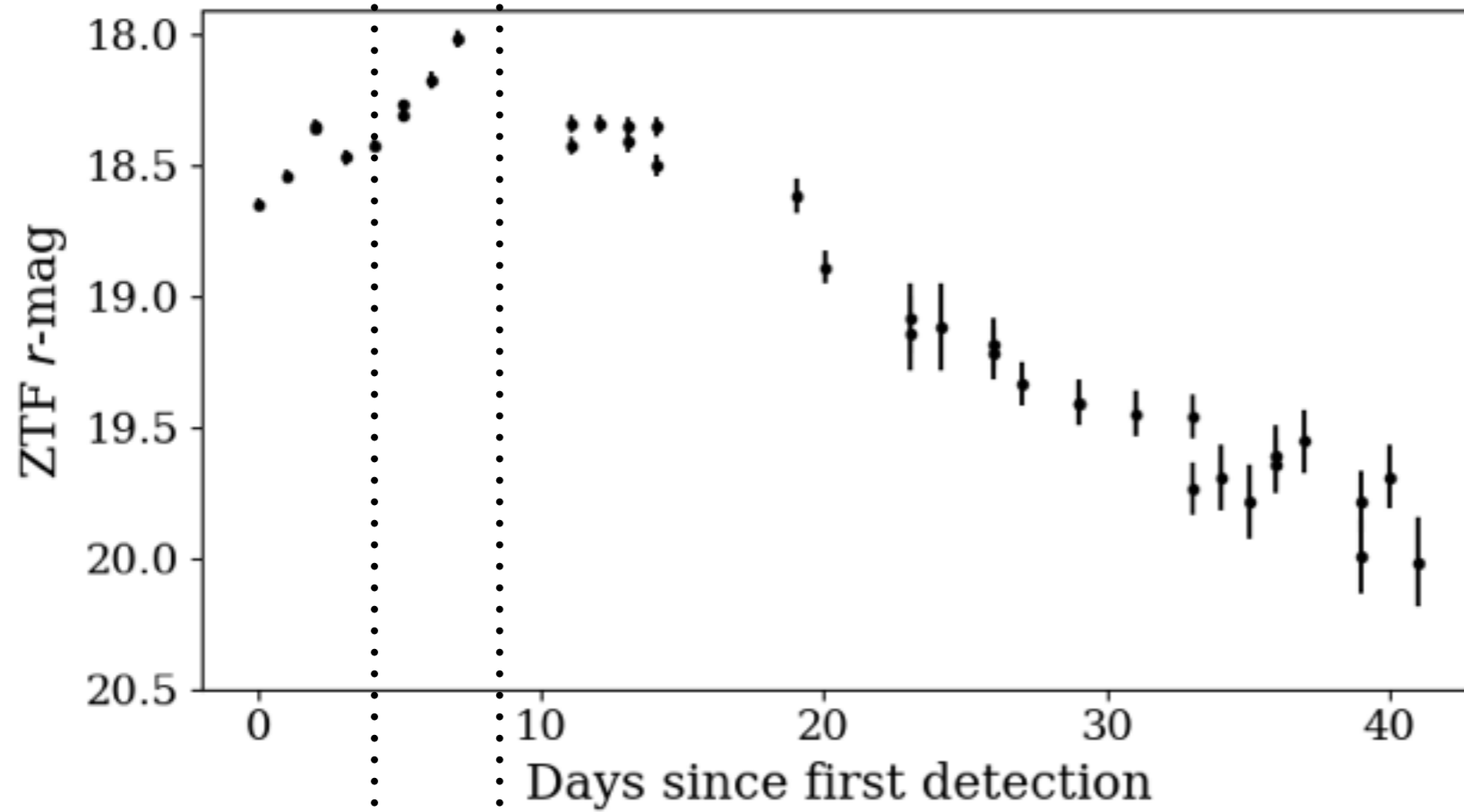
Step 2: Confirmation



Recent ZTF discovery: ZTF18aaqjovh

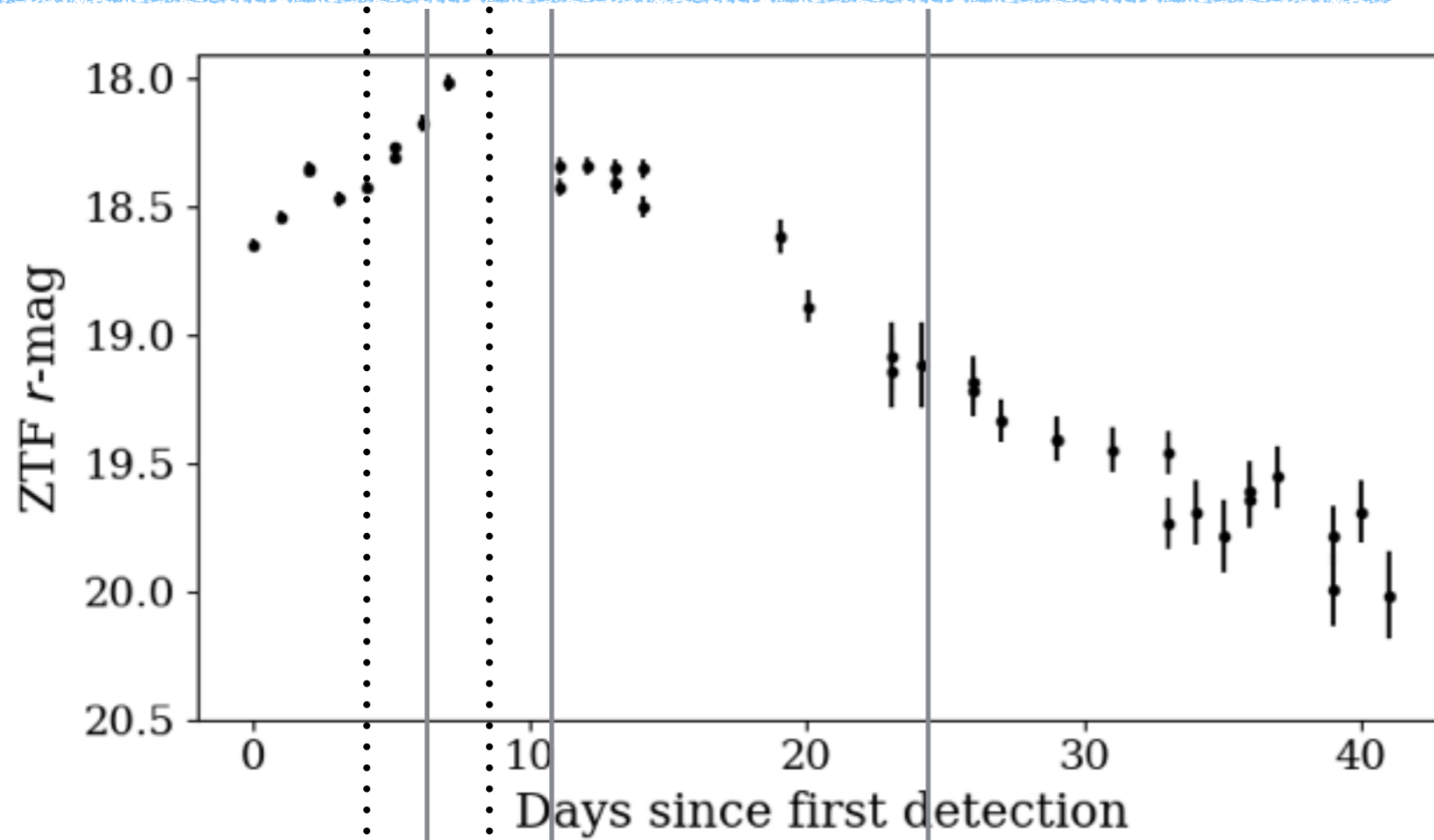


Recent ZTF discovery: ZTF18aaqjovh



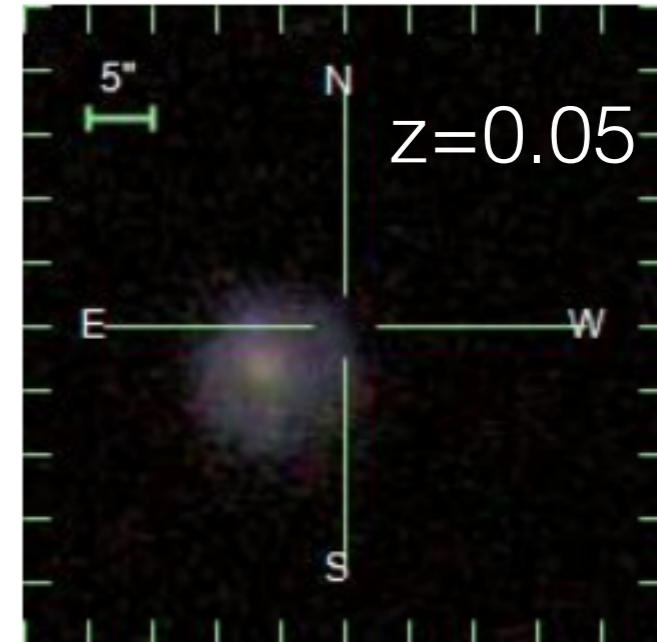
Classification with SEDM Keck spectrum

Recent ZTF discovery: ZTF18aaqjovh

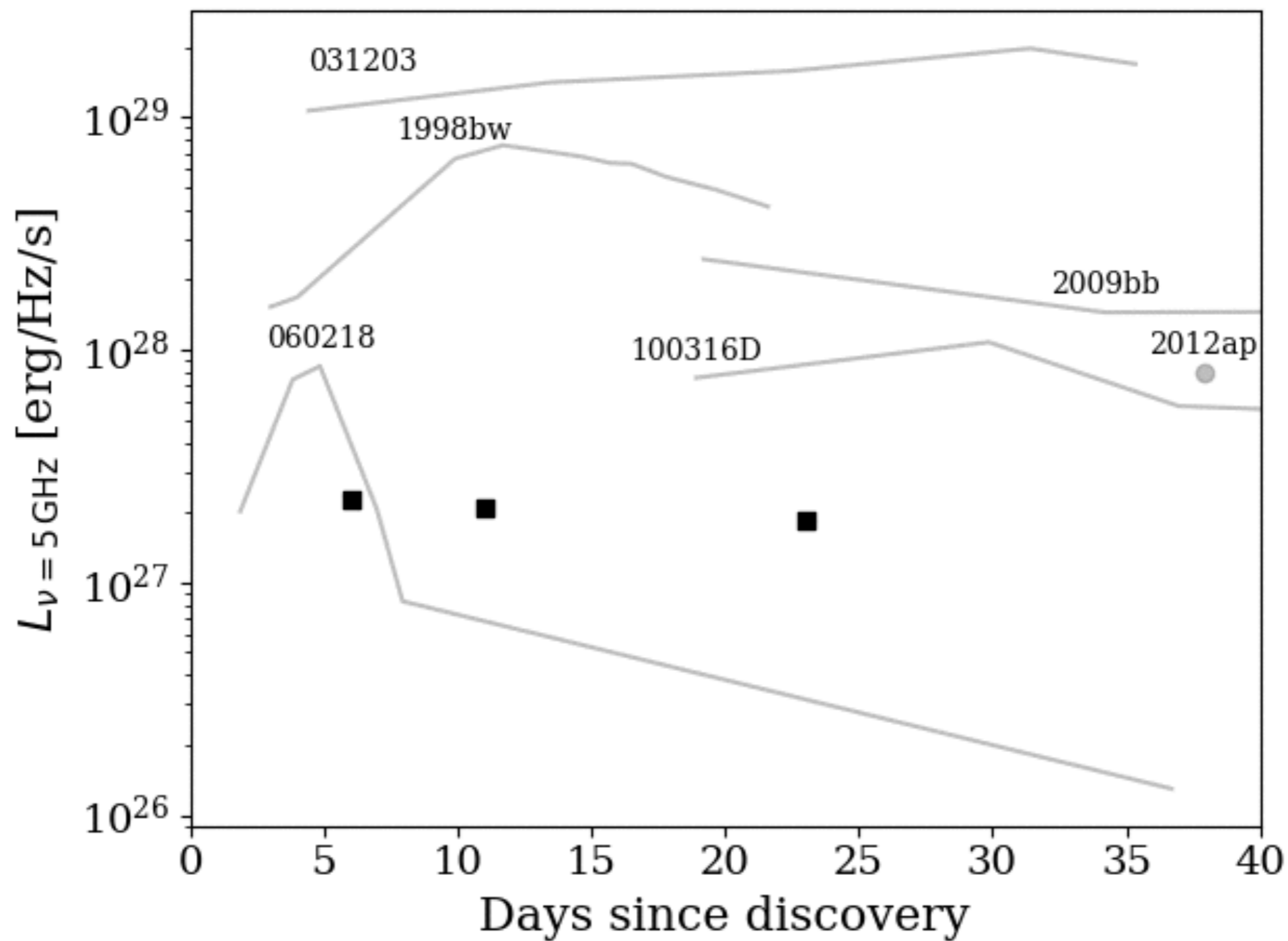


Classification
with SEDM

Keck
spectrum

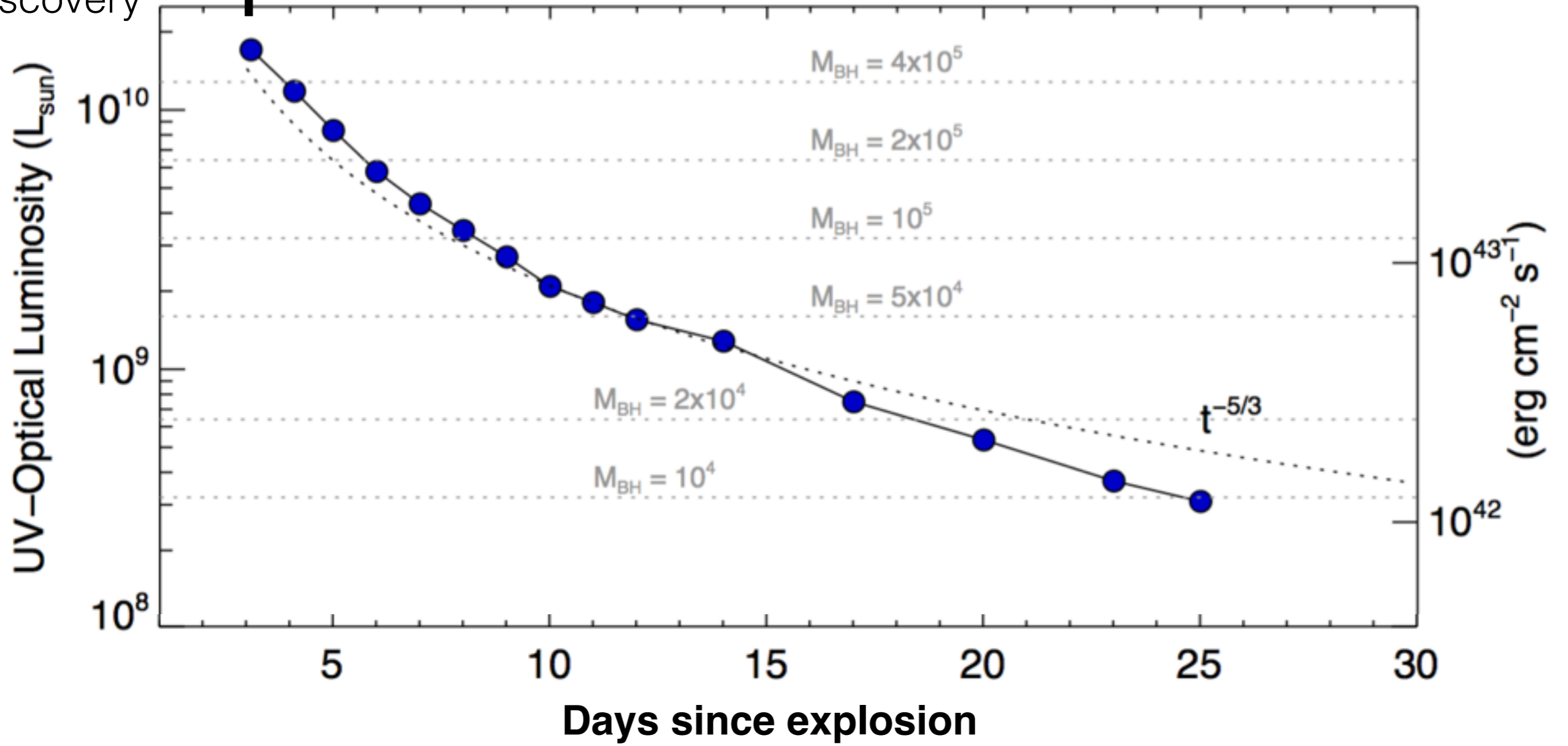


Recent ZTF discovery: ZTF18aaqjovh



AT2018cow

June 16:
Discovery



AT2018cow

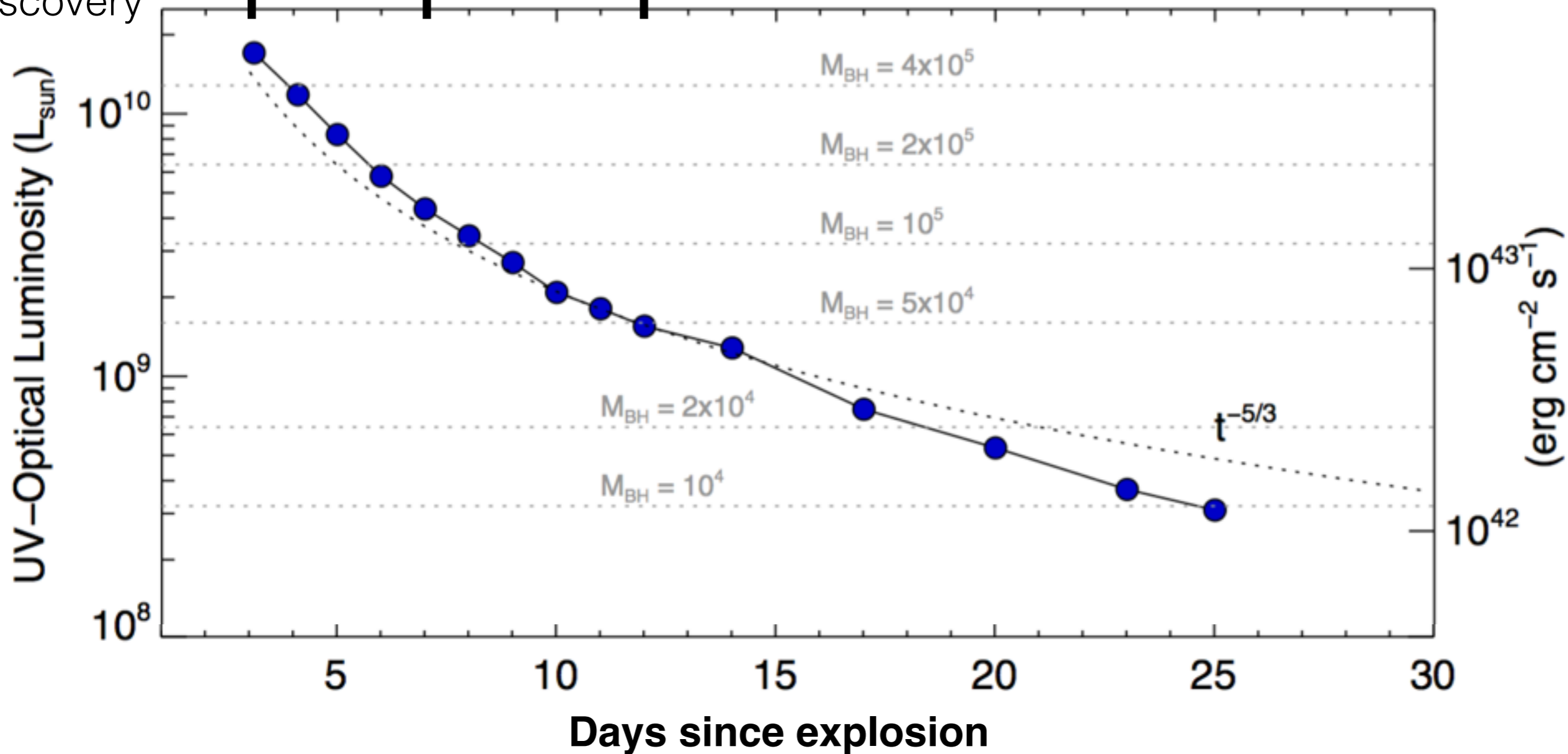
Begin SMA obs



VLBA & ALMA
proposals
accepted



June 16:
Discovery



AT2018cow

