Black Hole Hunters: A Microlensing Search for Quiescent Black Holes

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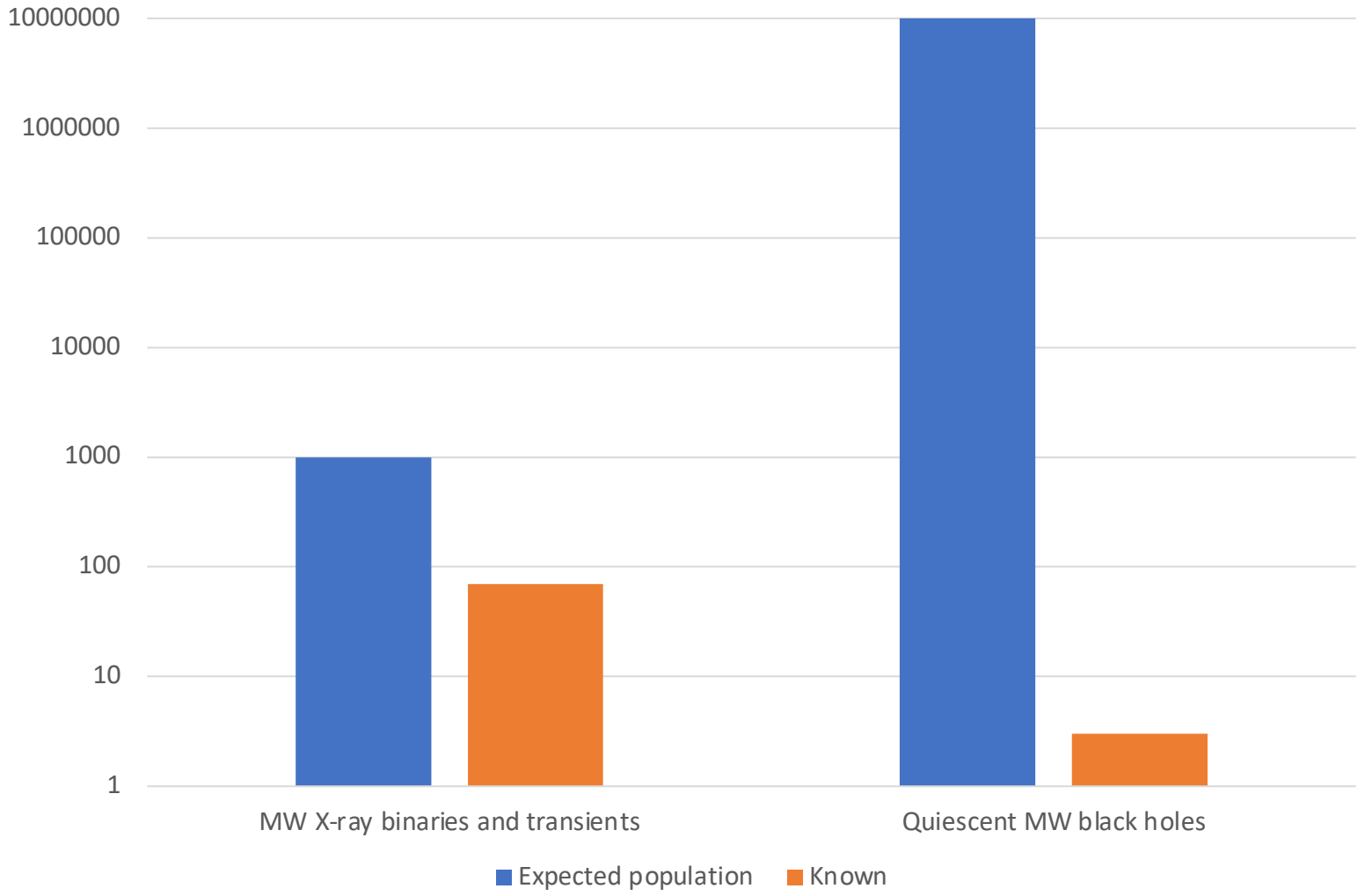
The Undiscovered Black Hole Population



Estimated numbers from El-Badry+ 2023, arXiv:2302.07880

Gravitational Microlensing

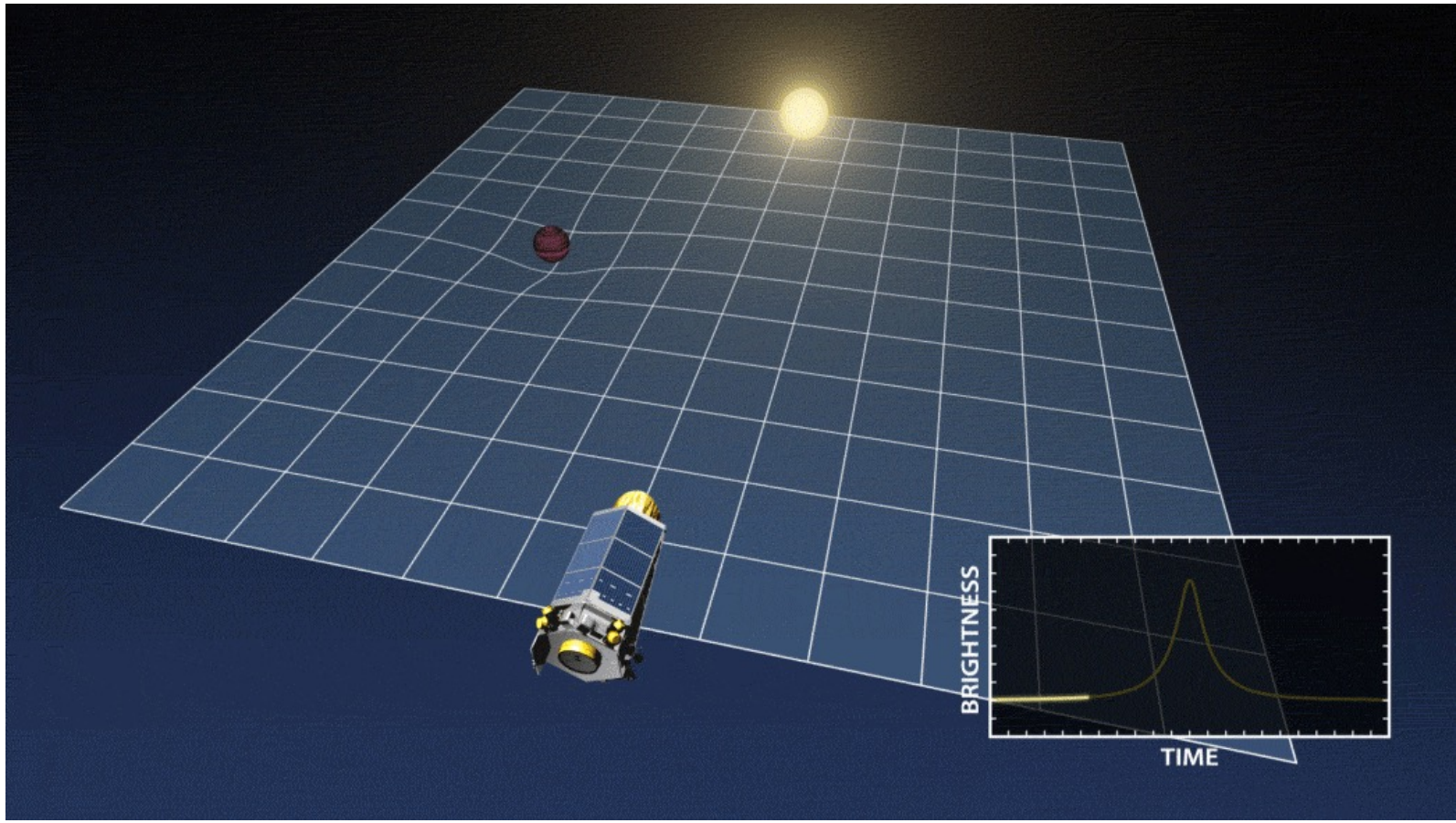
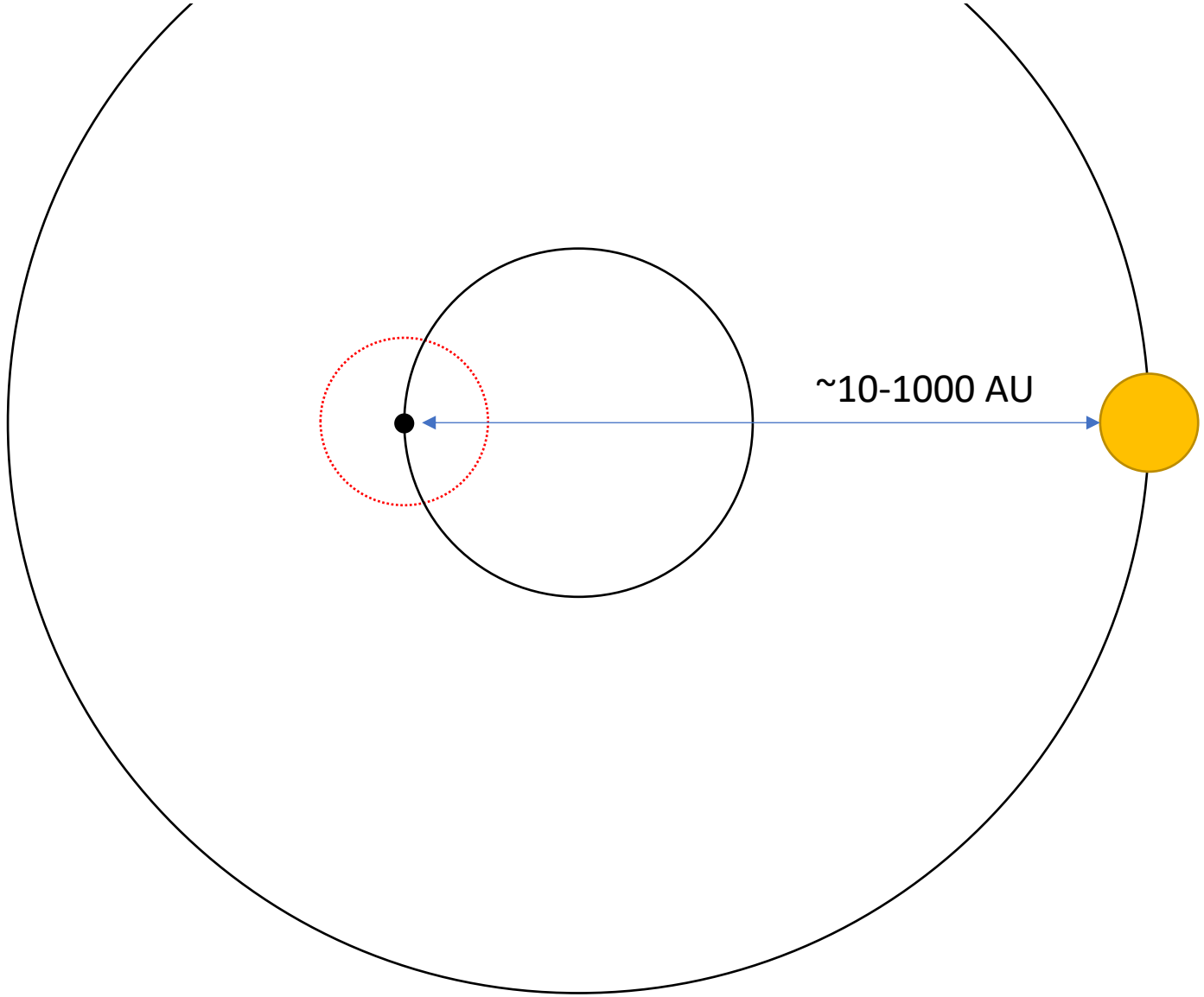


Image: Wikipedia

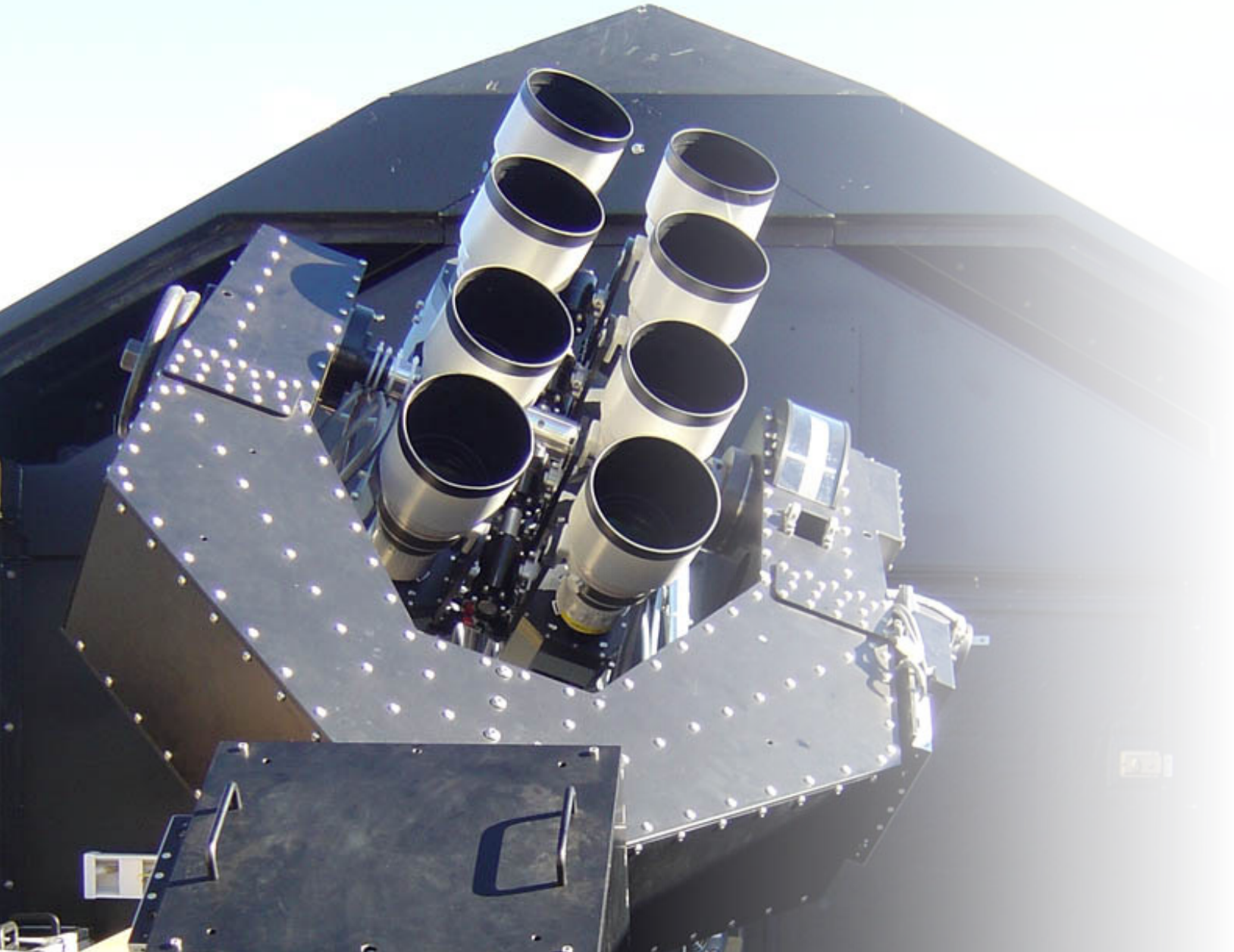
What would a self-lensing system look like?



~2-50 M_{sun} black hole
P_{orb}: ~50 - 5000 yr

~1-10 M_{sun} star

(Obviously not to scale)



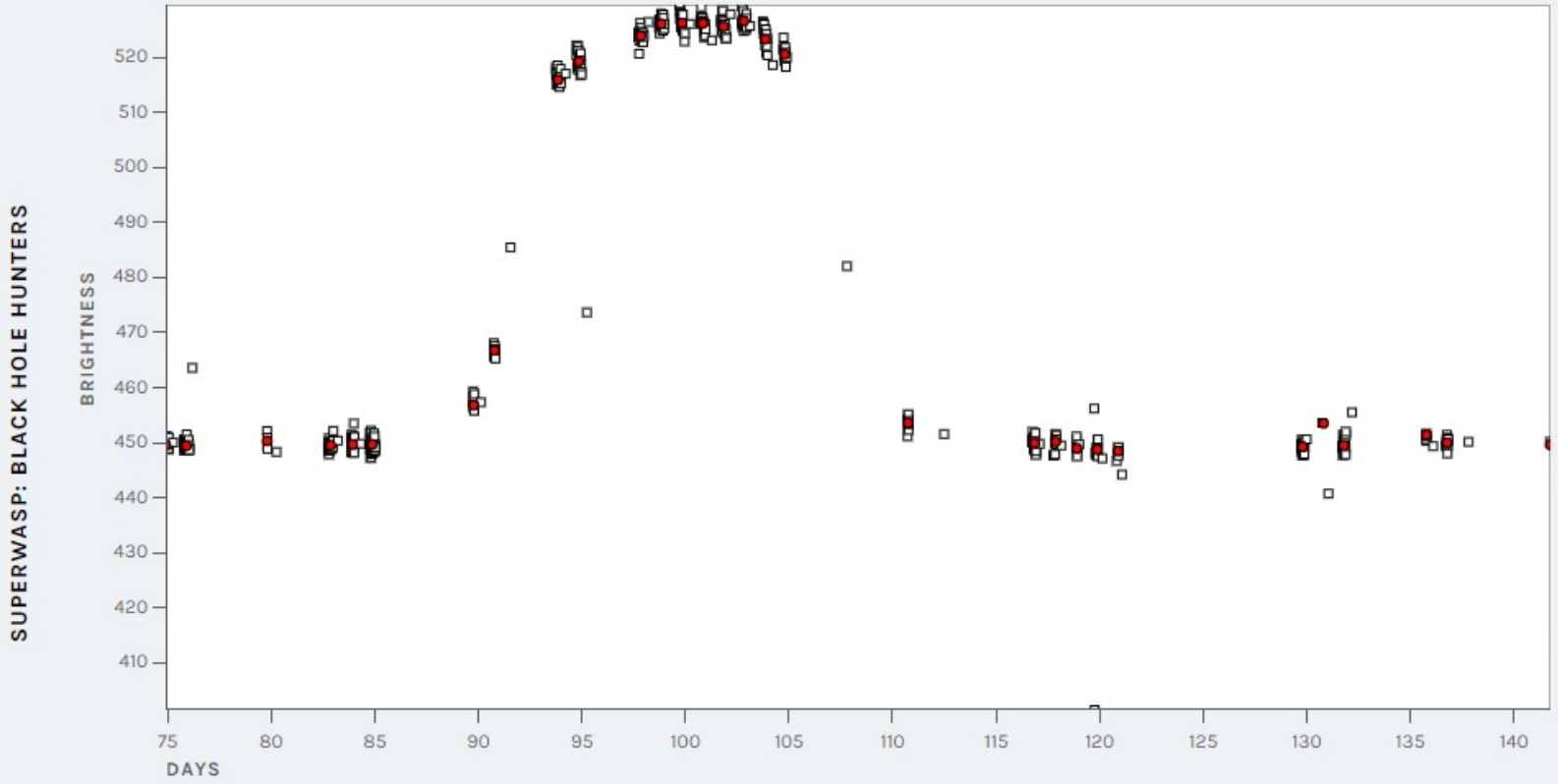
What is SuperWASP?

The **W**ide **A**ngle **S**earch for **P**lanets – a ground-based exoplanet search

Two telescopes (North and South)

SuperWASP: Black Hole Hunters

ABOUT | CLASSIFY | TALK | COLLECT | RECENTS



FIELD GUIDE

SUBJECT INFO | ADD TO FAVORITES | ADD TO COLLECTIONS

TASK | TUTORIAL

Can you see a sharp peak in the graph that might be a hidden black hole?

Look for **symmetrical** peak-like features in the light curve containing **four or more red circles**. If you see a feature that fits the description, then answer "Yes". Otherwise, answer "No".

Yes

No

NEED SOME HELP WITH THIS TASK?

Done & Talk | Done

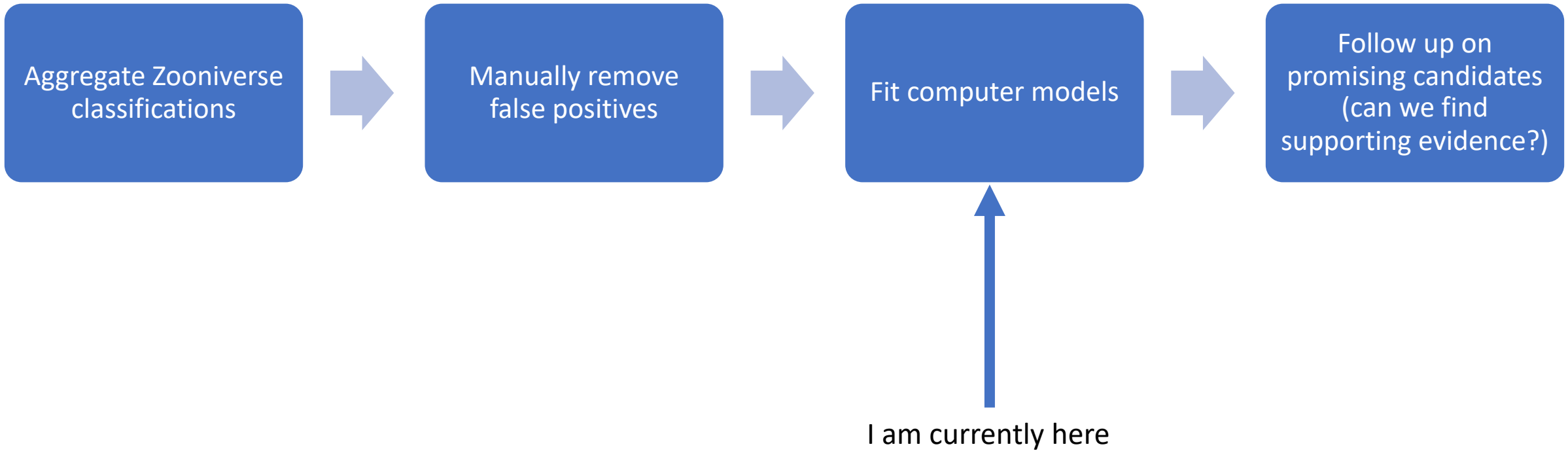
SWITCH TO DARK THEME

Finished for the day?

Your answers are saved for the research team while you're working. See the project stats and return to the SuperWASP: Black Hole Hunters home page.

5,652 volunteers
2.1 million classifications
208,700 completed subjects

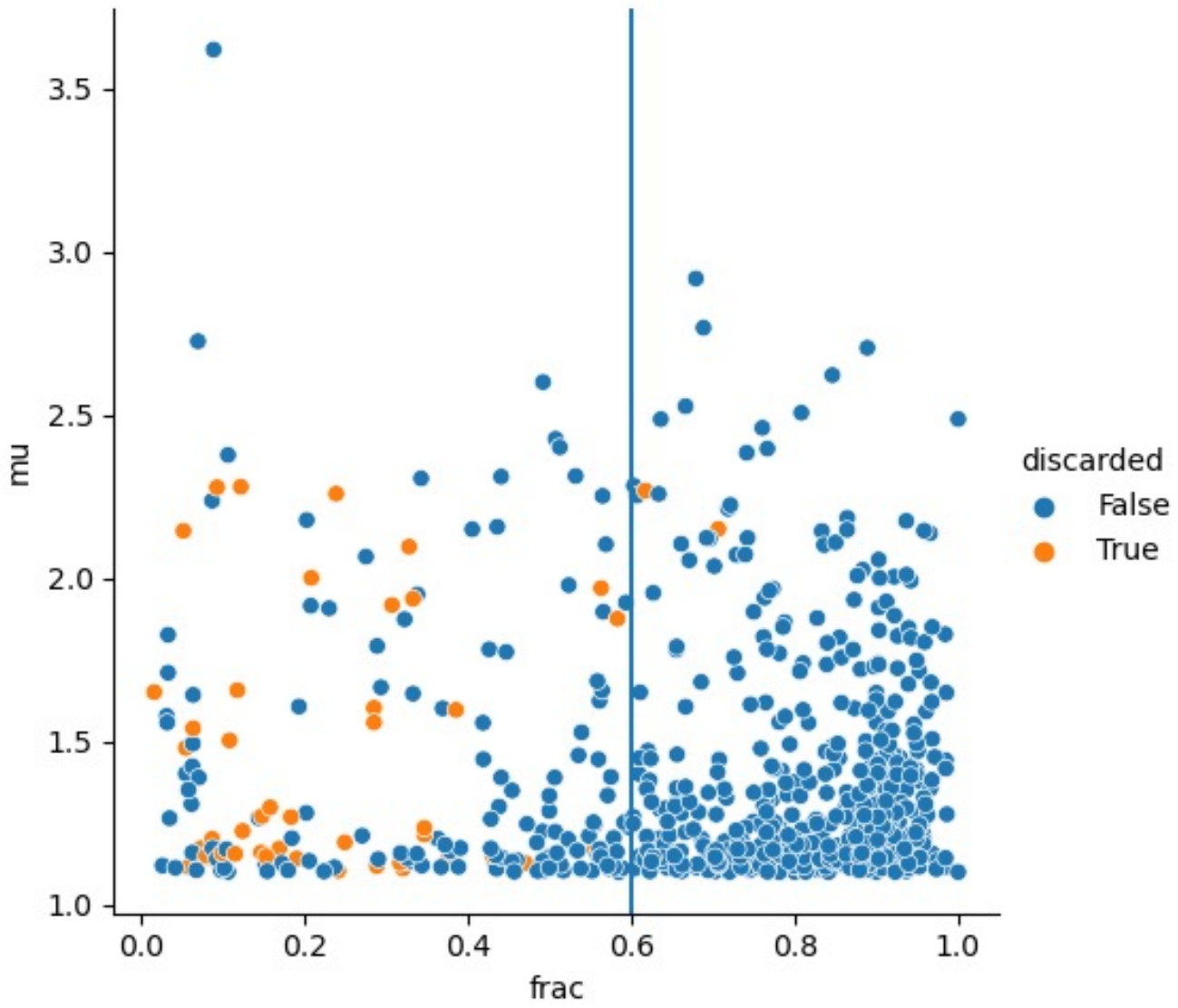
Candidate Analysis



1,000+ candidates from Zooniverse
70 candidates after manual review

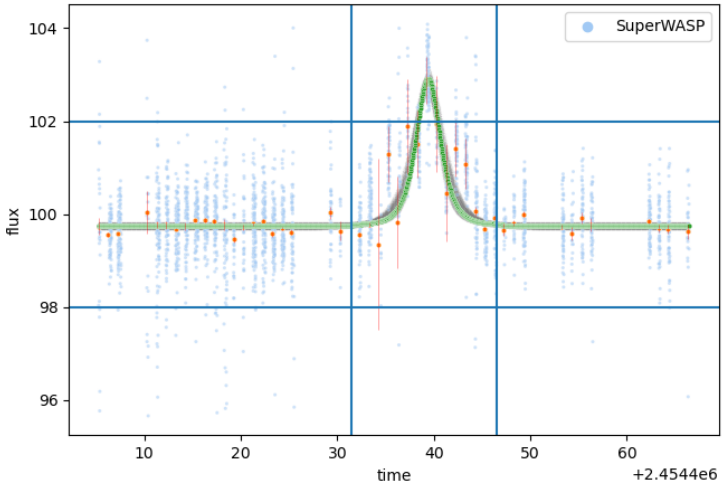
… but we still need to fit these to our lensing model!

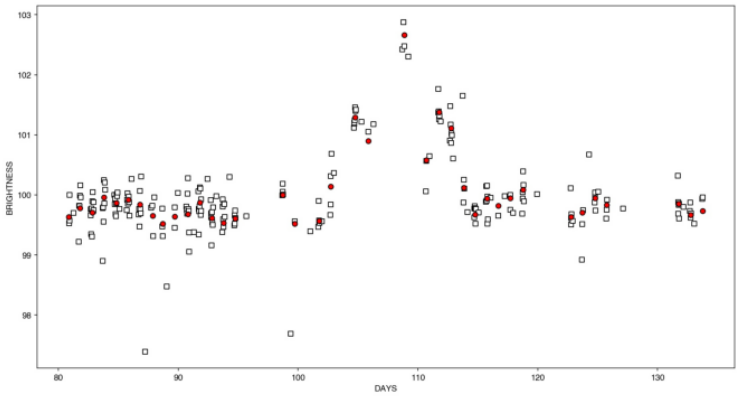
Recovery of Simulated Events

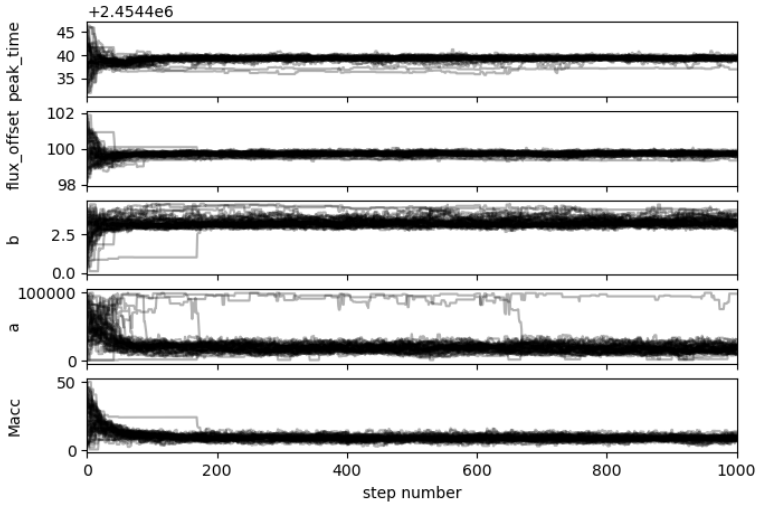


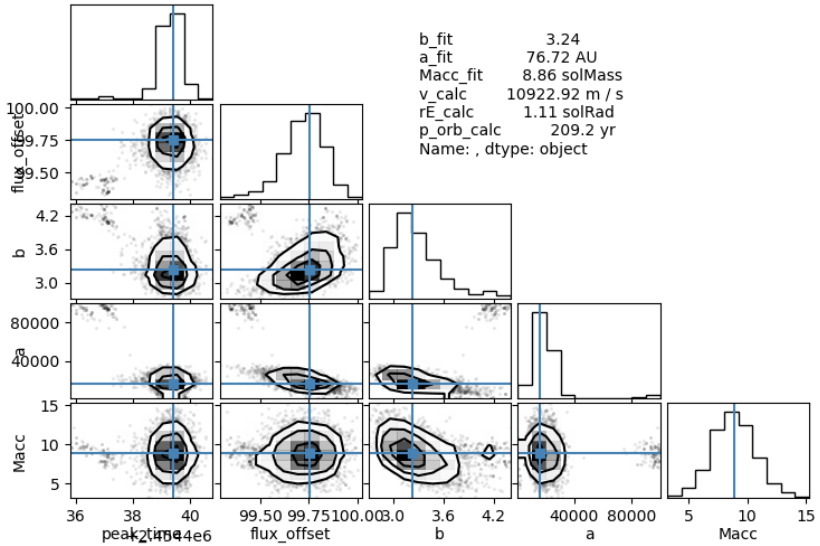
An Example Candidate

Warning: Contains early results! These may change before publication.









Ideas for candidate follow up

Corroborate with photometry from other surveys (ASAS-SN)

Radial velocity (where feasible)

Excess astrometric noise in Gaia

Supernova products in spectrum

Kick velocity from supernova

Future Projects

Planning

Later

What’s next

Paper with first candidates in 2023

Following up on promising candidates

More projects in planning

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superwasp.org/get-involved