

Comparison of detection methods

Compare these methods with respect to a scientific question I'll give you later:

- Transits
- Radial Velocity
- Direct imaging
- Astrometry
- Microlensing

Comparison of detection methods

Procedure:

- 1) Form groups of 5 or more students
- 2) Discuss scientific question in group
- 3) Form new groups with one representative from each old group
- 4) Discuss findings in the new groups
- 5) Meet again in old groups, discuss if new questions or insights came up in new groups

Comparison of detection methods

Why do we do this?

-> Everyone needs to say something

-> Everyone needs to explain something

-> Everyone needs to give feedback to group

What to find out

About yourself:

- Beforehand, reflect: “When I interact in groups, I usually behave like this: ... And what happens is ...”
- While in group: Try out a (friendly) behavior different from your default
- Afterwards, reflect: “This time, I tried to behave like this: ... And what happened was ...”

What to find out

About yourself:

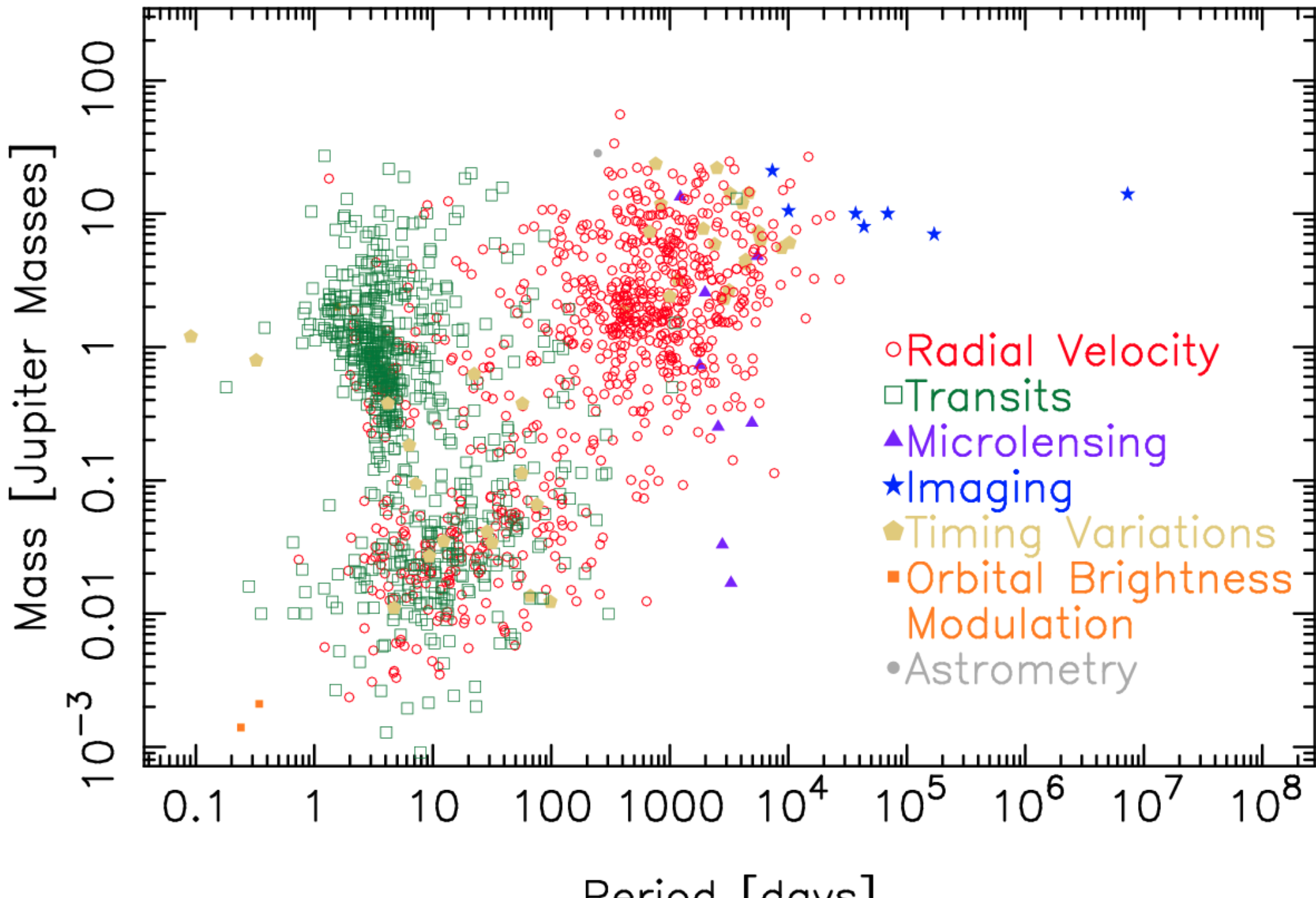
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About science:

“Where in a diagram of planet size/mass vs. orbital period does my method yield the most detections?”

Mass – Period Distribution

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exoplanetarchive.ipac.caltech.edu



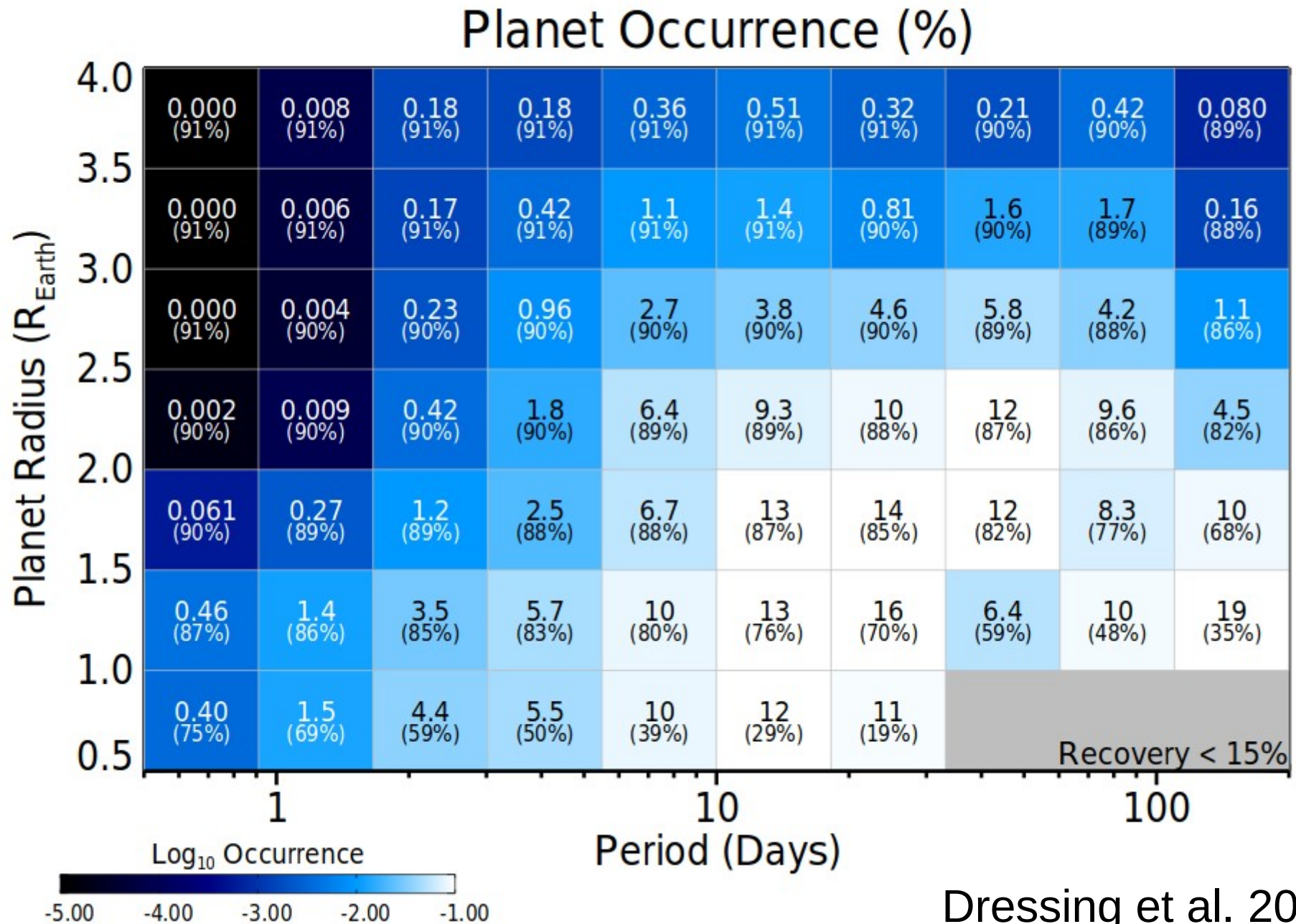
Planet occurrence rates

- Planet occurrence: probability that a planet with given properties exists (around a given type of star)
- not the same as detection efficiency!

occurrence * detection efficiency = number of detected planets

- need to model detection efficiency for different planet types and methods, then infer occurrence rates.

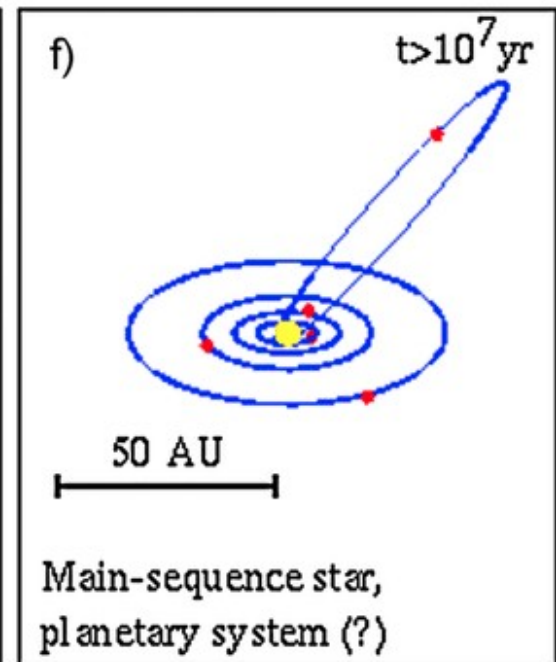
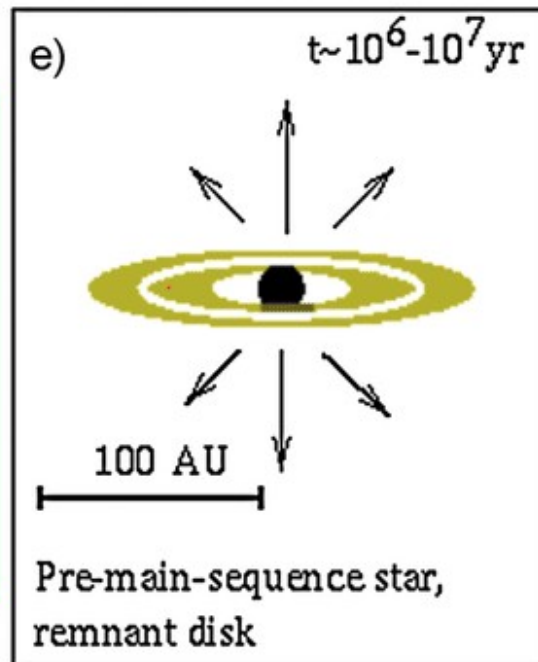
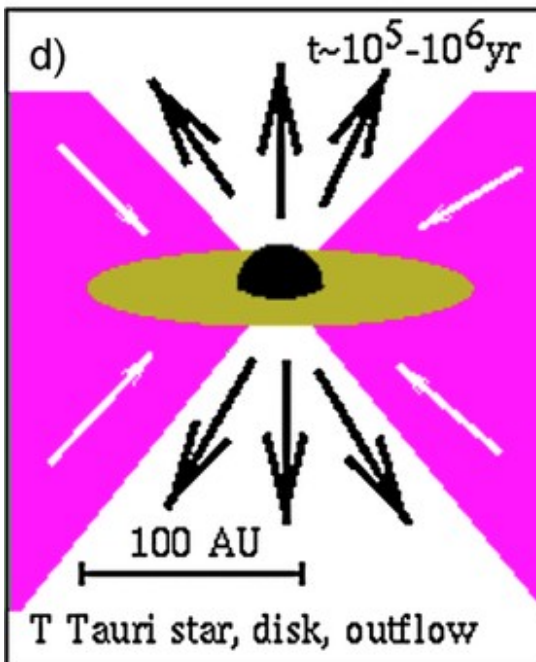
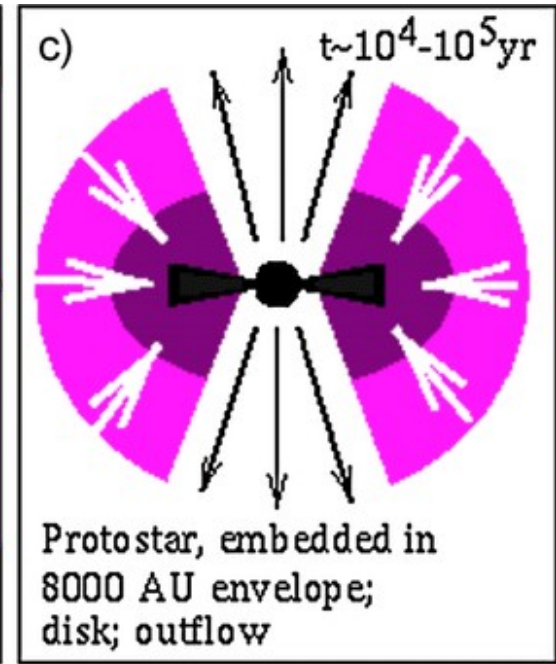
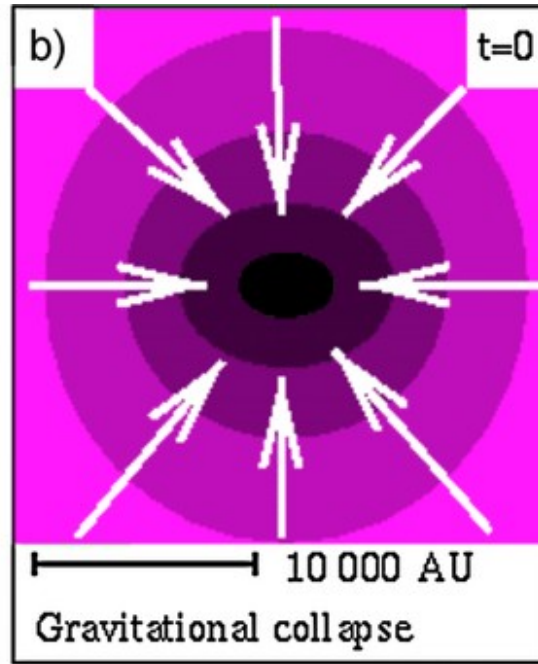
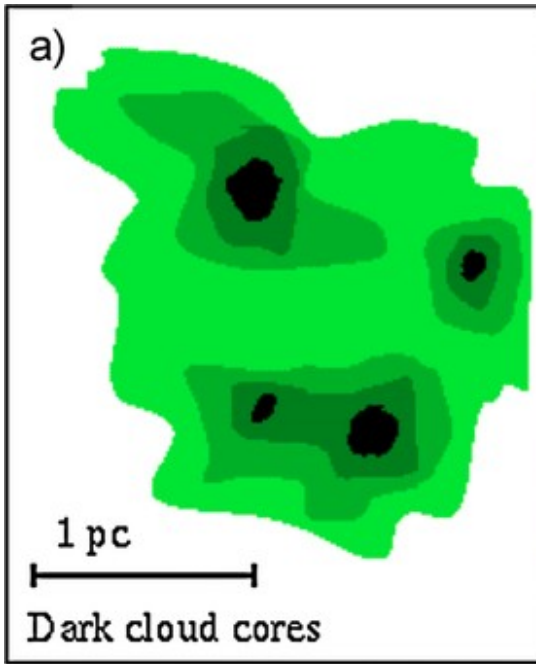
Transits for small planet around small stars:



Star formation

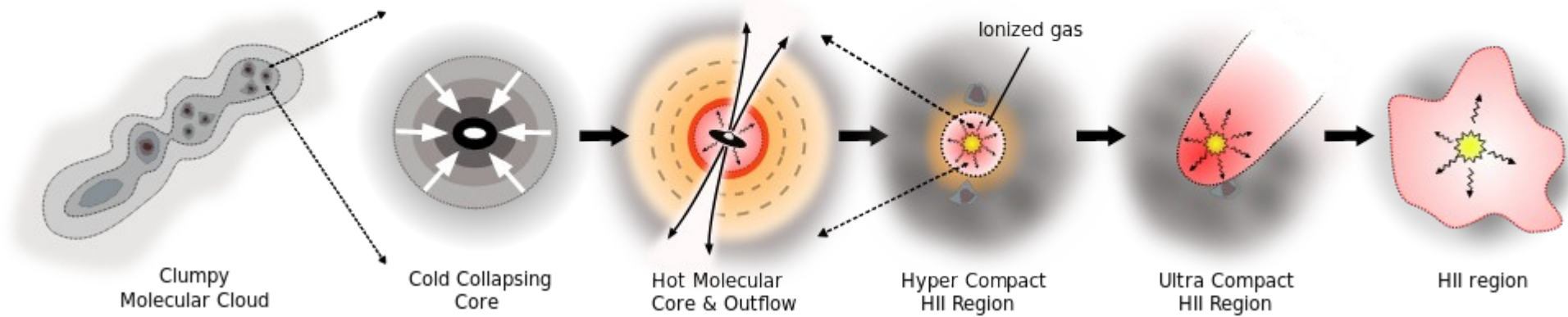
Planets are thought of as a natural byproduct of star formation.

Star formation

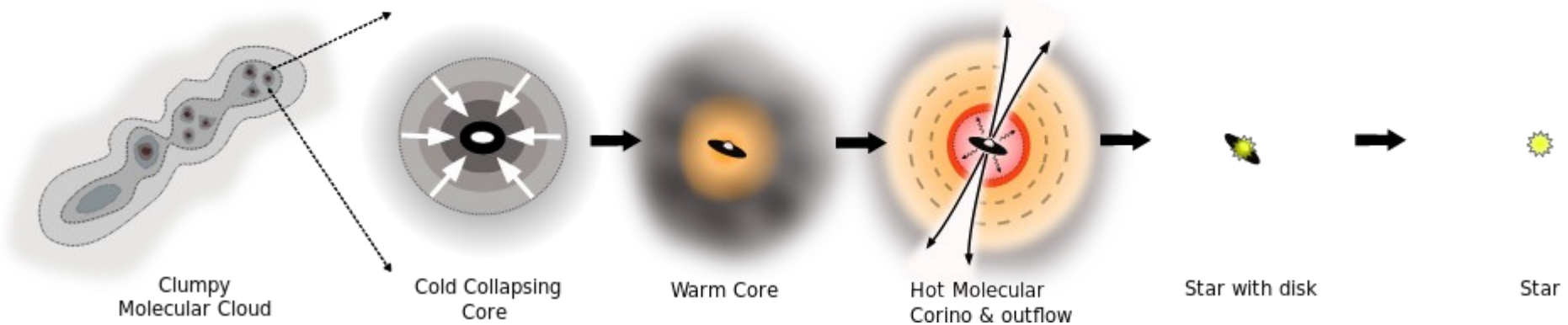


Star formation

High-mass SF



Low-mass SF



A. Ginsburg, after C. Prucell.