



# Investigating Dust Growth in Protoplanetary Discs



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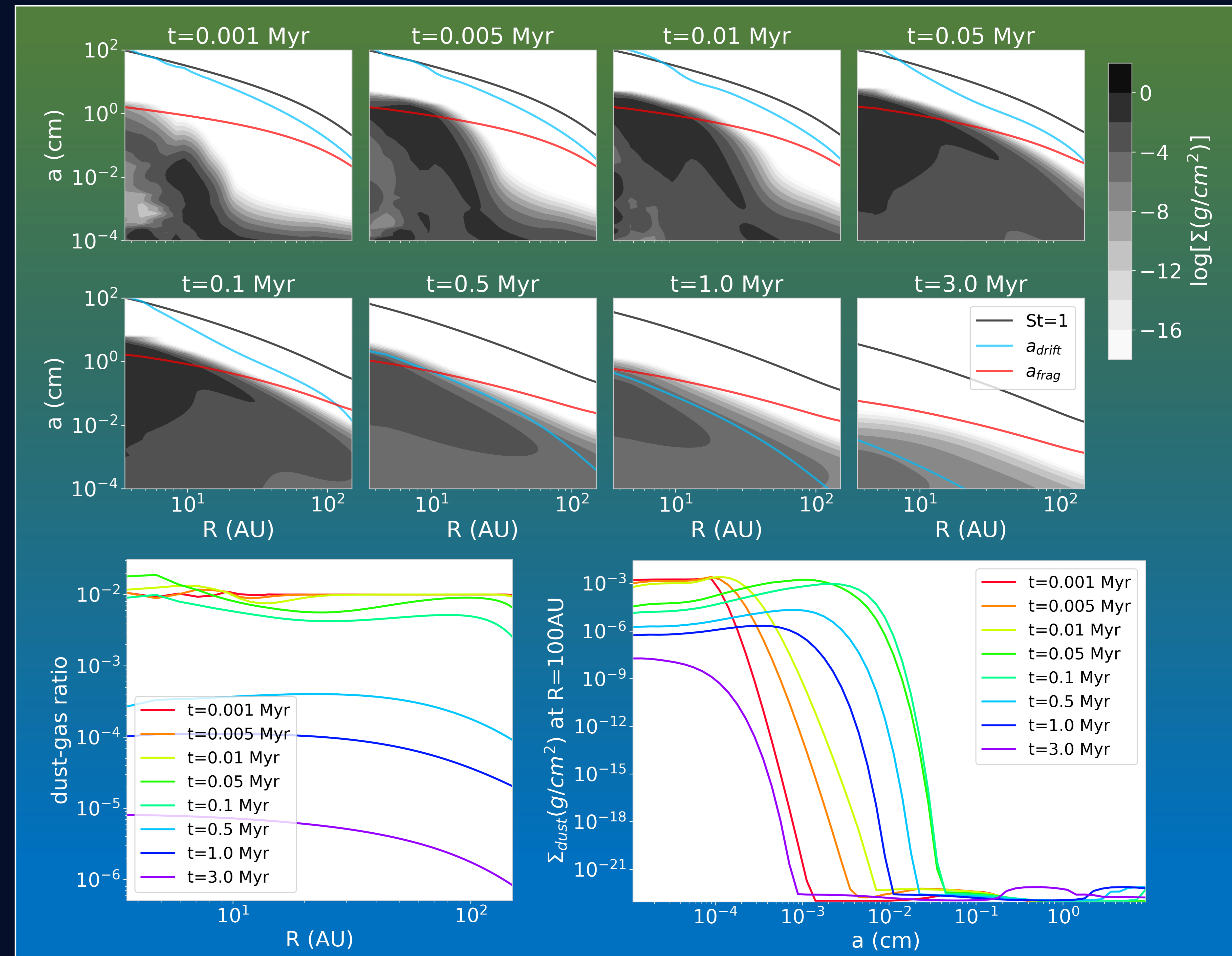
## ① Questions

- What factors determine how dust growth proceeds in protoplanetary discs?
- How does the overdensity of dust in ring structures affect dust growth in these regions?

## ② Work so far...

New application of FARGO3D [1] to run models which include:

- Planet embedded in a disc, fixed dust size distribution (no growth) [2].
  - Dust coagulation/fragmentation, no planet [3].
    - Planets within  $\sim 8-20 M_{\oplus}$  carve out a gap and ring exterior to planet.
    - Dust growth up to size limit imposed by fragmentation and drift.
    - Subsequent reduction in grain size at density peak due to drop in dust-gas ratio in outer disc, causing drift boundary to move inwards [4].
- Are these results supported by past studies?
  - Can we explain the dust growth seen at grain sizes beyond the density peak?



## ③ Next Steps

- Model dust growth in the presence of an embedded planet, producing a gap and ring.
- Study dust growth in rings – effect of overdensity?