Fate Of Infalling Gas Clump Onto High-z Quasar

To be submitted (2020)

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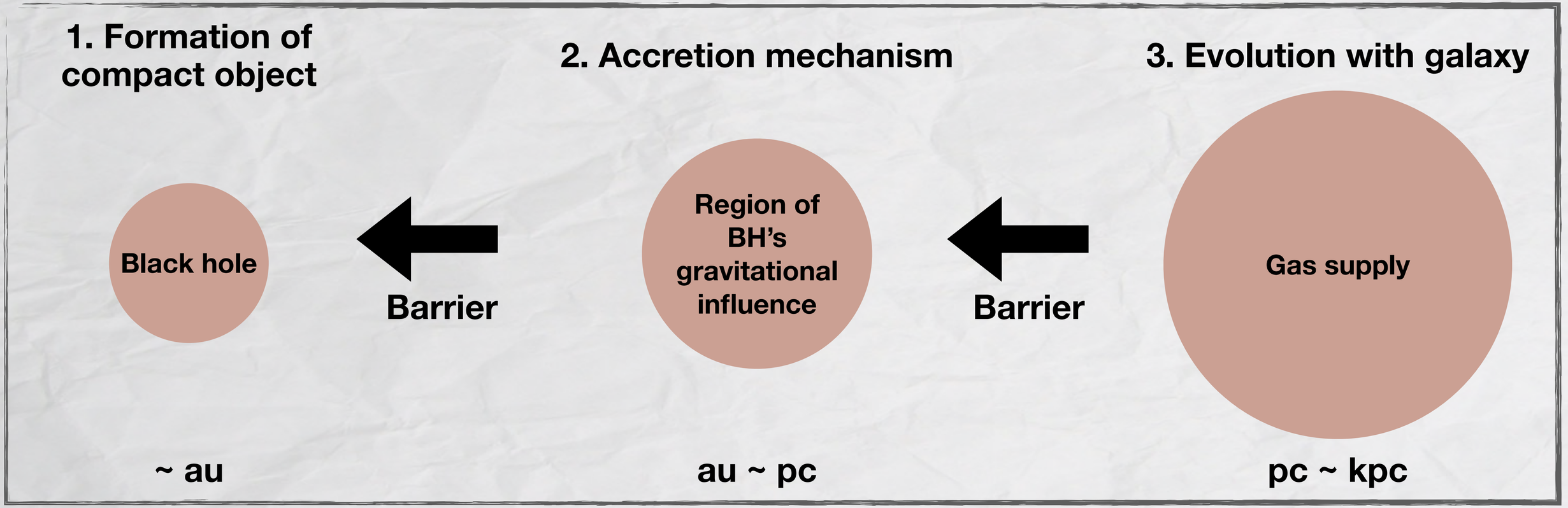
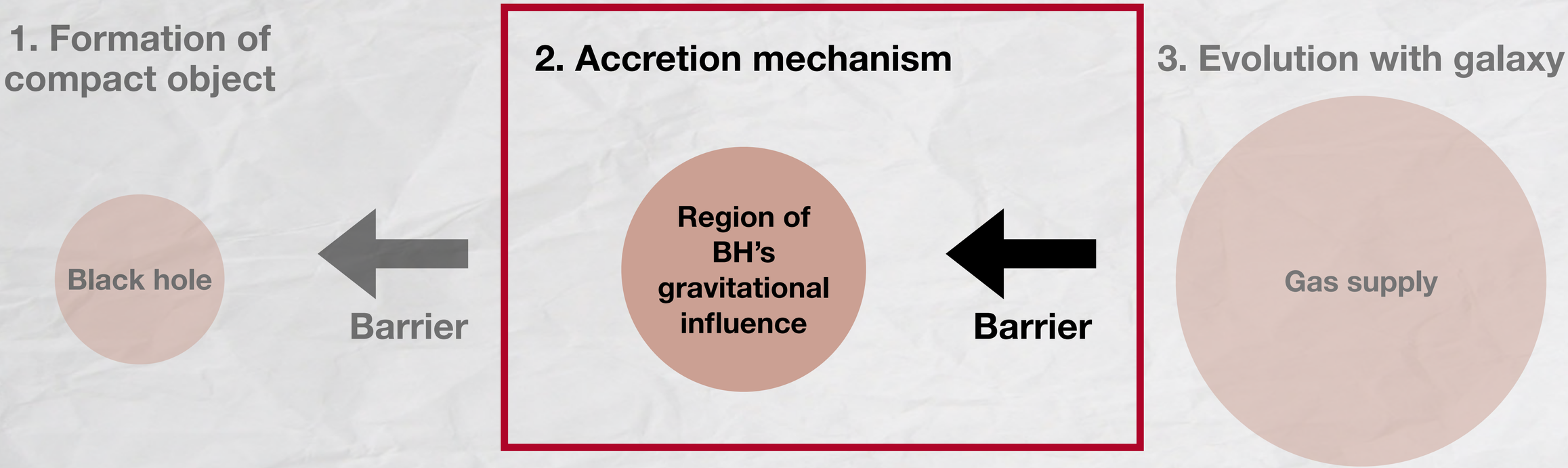
Growth Of Supermassive Black Hole On Three Different Scales



https://arxiv.org/abs/1910.12888

Break-down Of Barrier With Help Of Radiation In A Cosmological Simulation



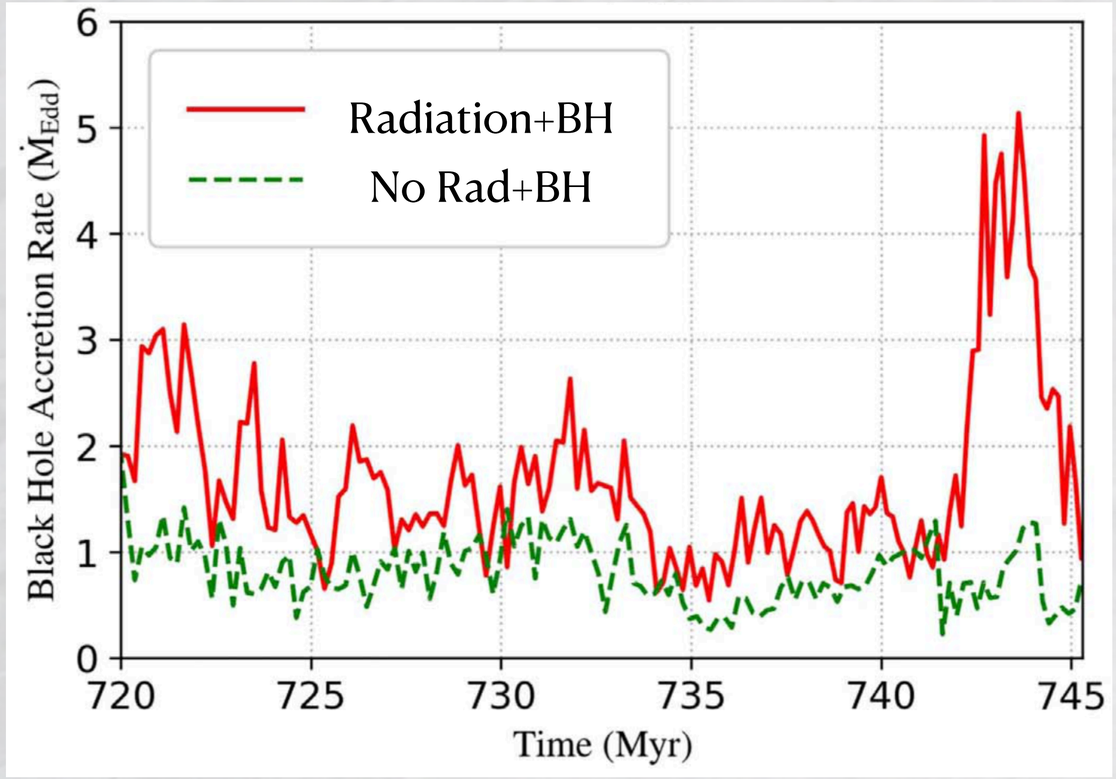
Barriers

- Competing accretion channels - e.g. star formation

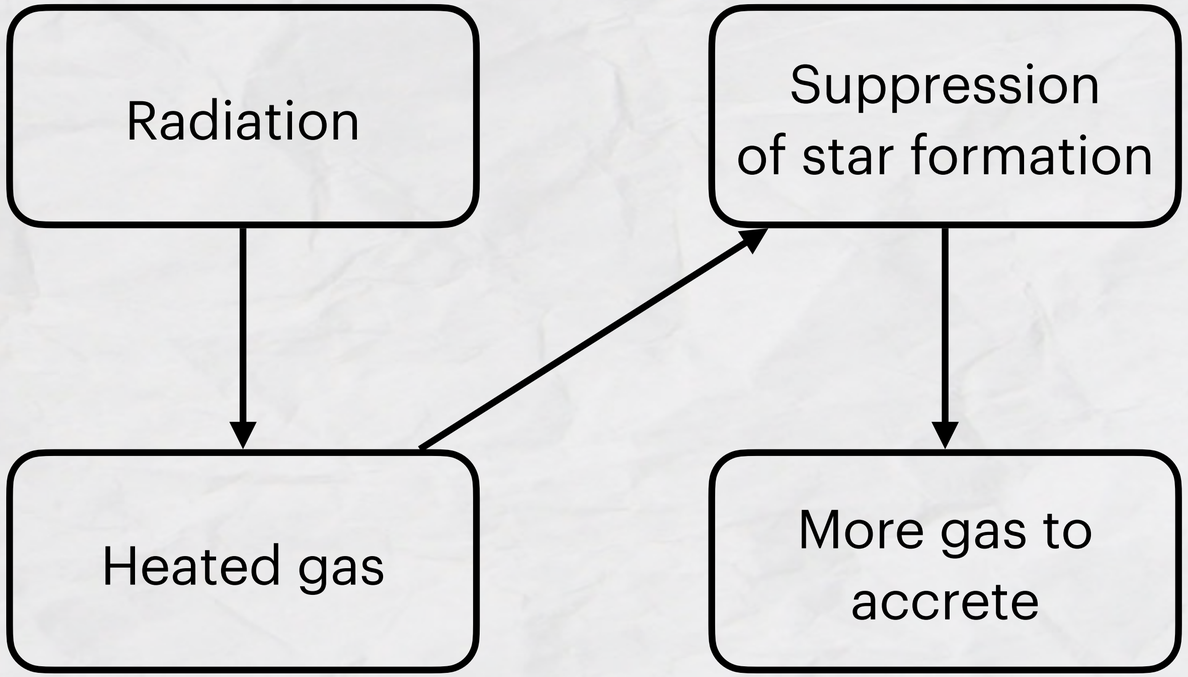
Kim et al. 2019 including myself

https://arxiv.org/abs/1910.12888

Increase In BH Accretion With Radiation Feedback



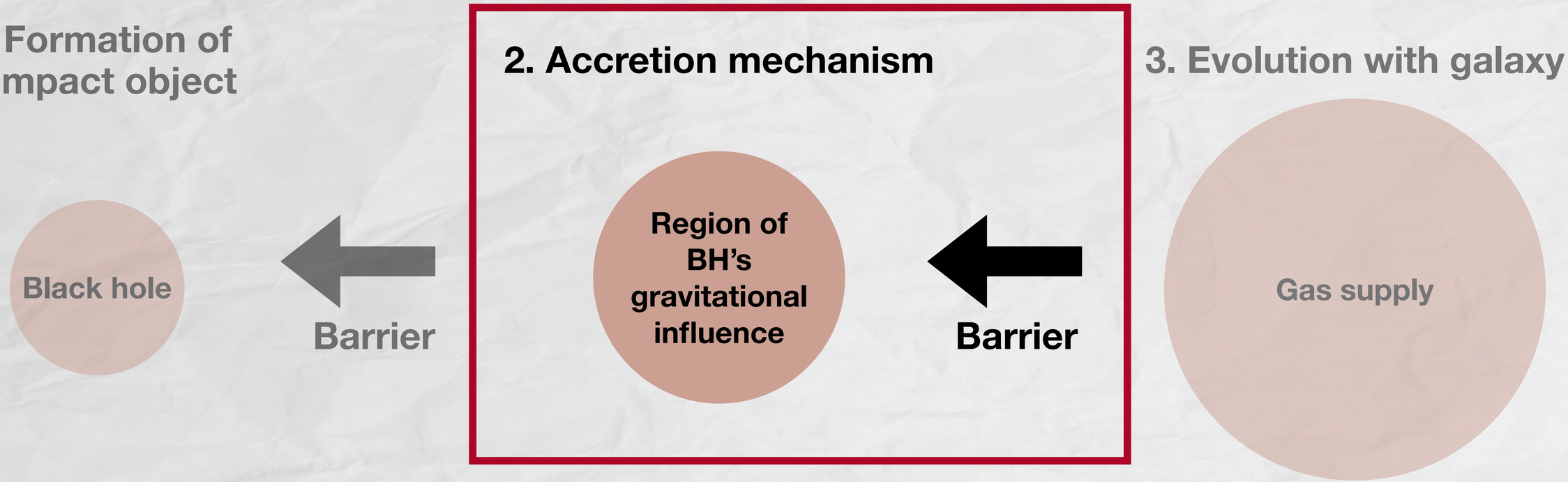
Kim et al. 2019 including myself



The radiation helps **gas overcome the barrier (star formation) more easily.**

https://arxiv.org/abs/1910.12888

Break-down Of Barrier With Help Of Radiation

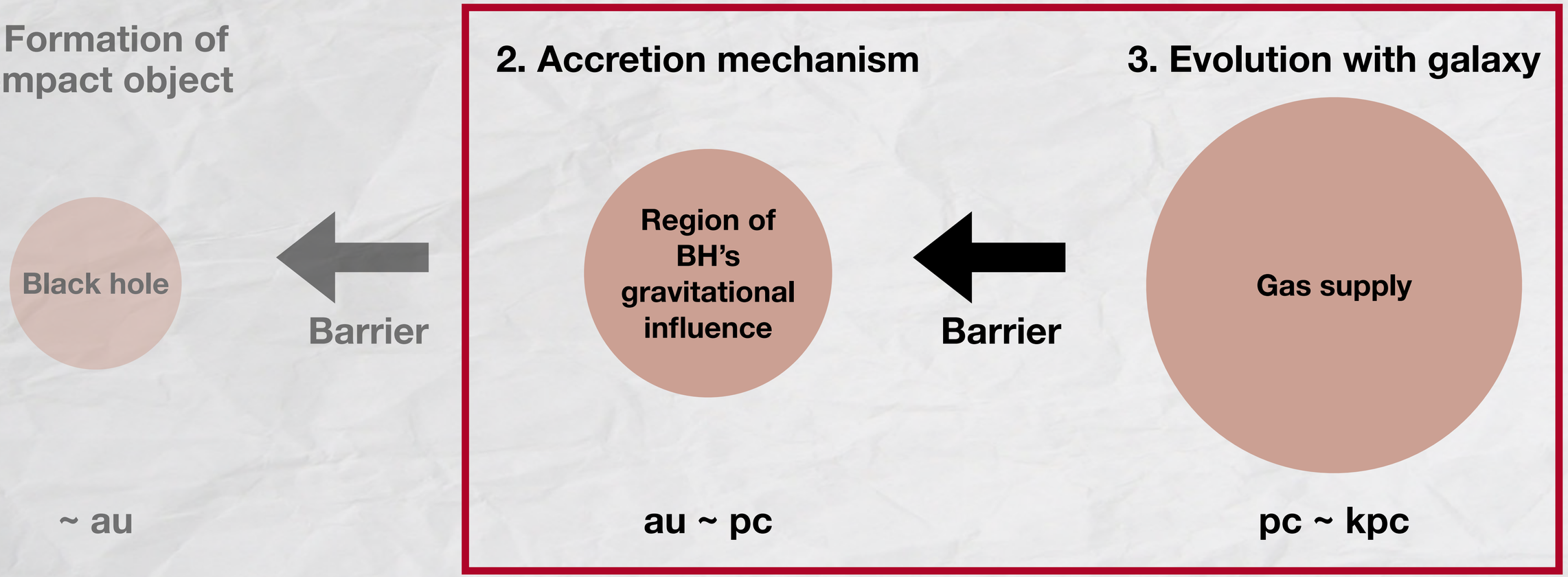


Barriers

- **Competing accretion channels - e.g. star formation**

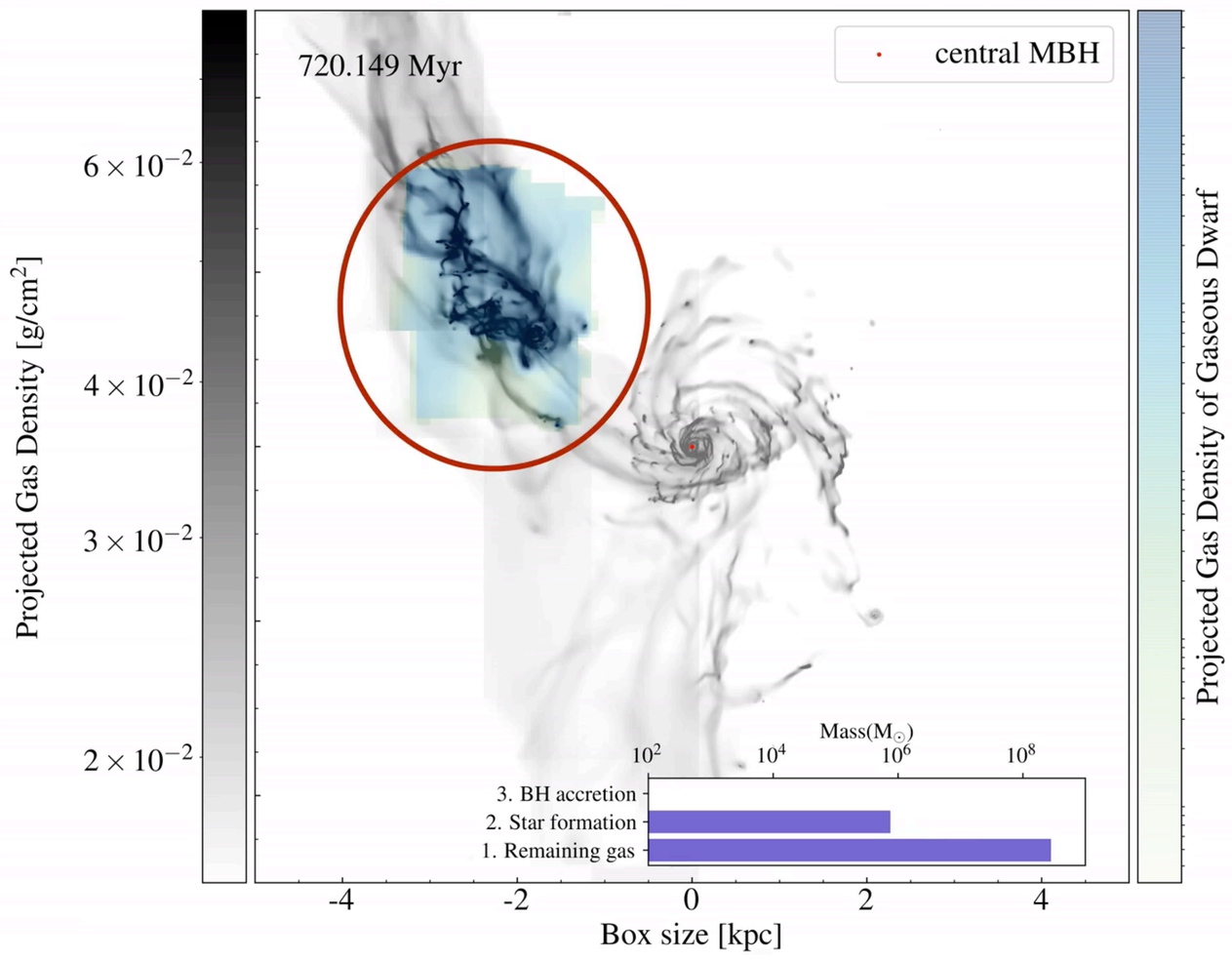
Kim et al. 2019 including myself

Beyond Vicinity of BH Towards Gas Supply



Preliminary

Infalling Gaseous Dwarf Colored To See Its Fate



- Trace the density of the gaseous dwarf alone explicitly.
- Trace how much gas of the dwarf turns into stars or is accreted onto black hole.
- Study contribution of the incoming gaseous dwarf to the growth of galaxy and black hole.

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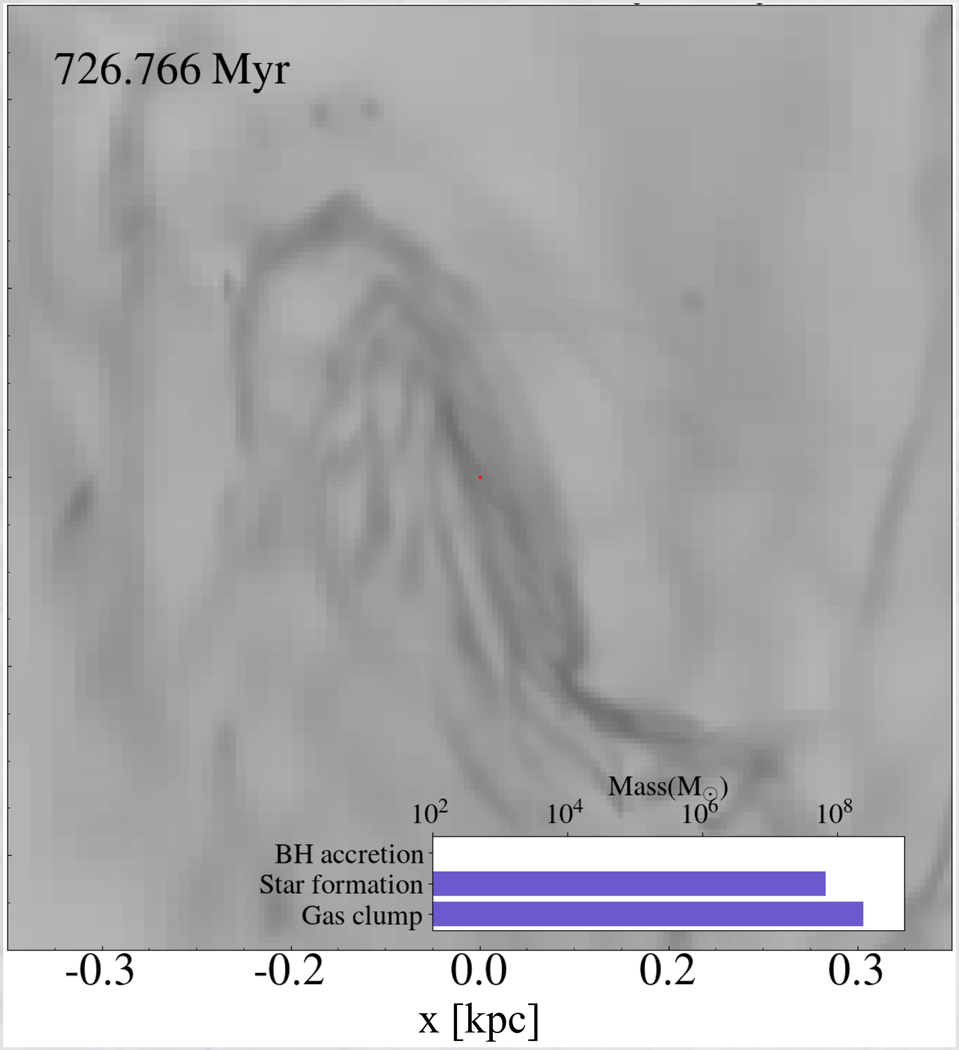
Preliminary

Projected Density Of One Snapshot



You Might Not Be Able To Notice Anything Special

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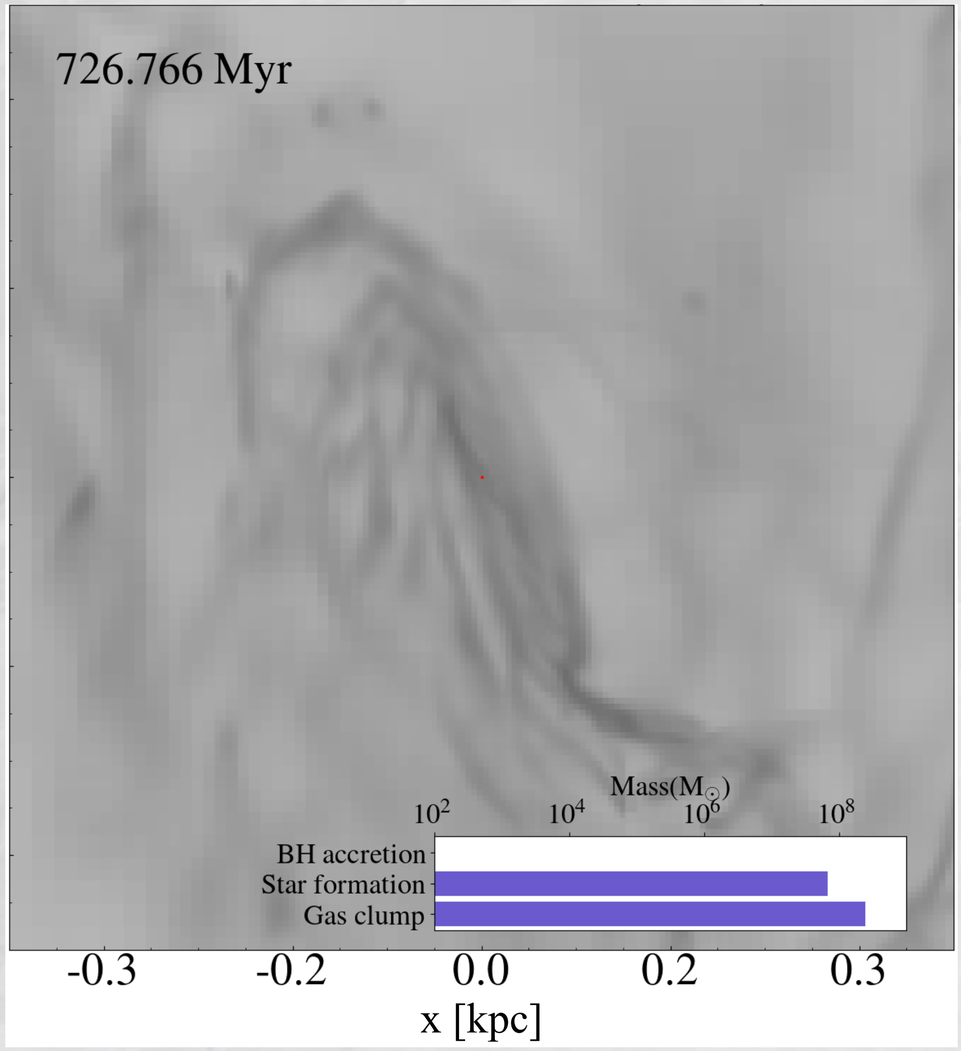
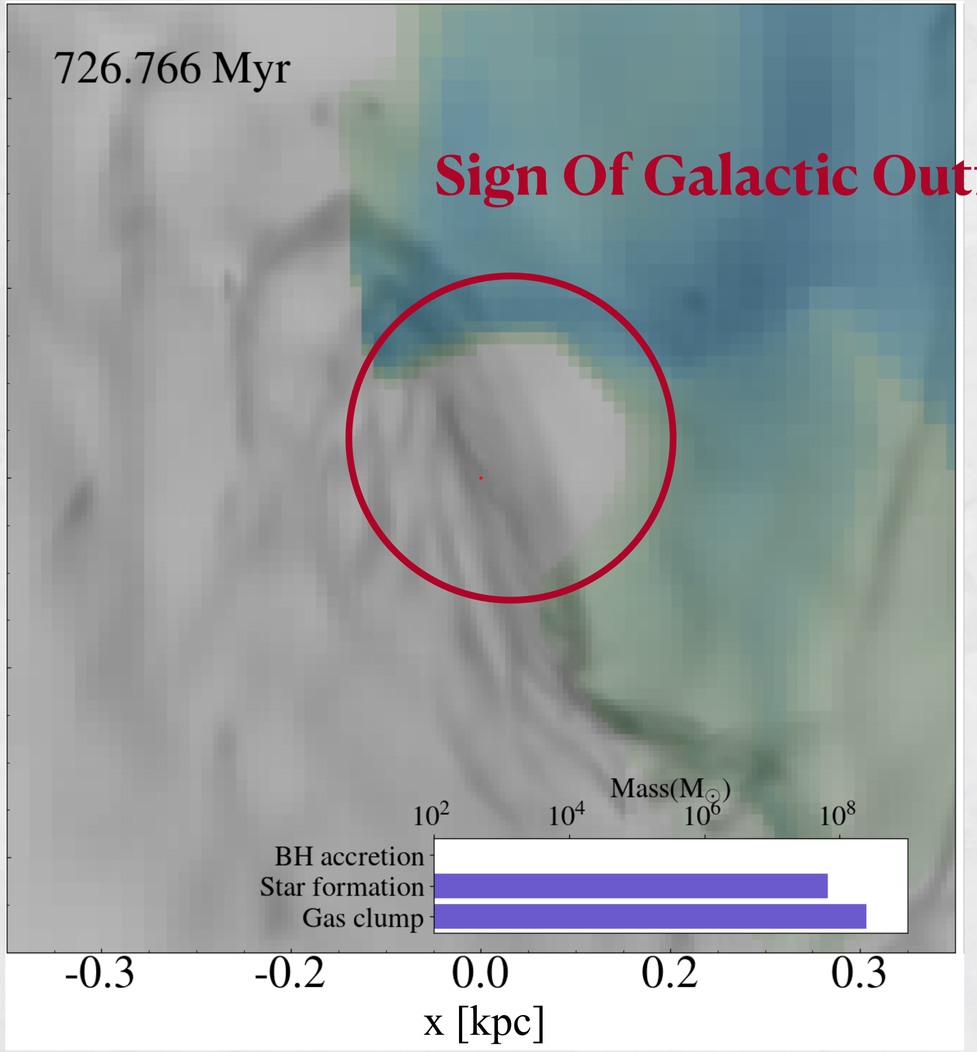
Preliminary

Detailed Gas Dynamics With Coloring Method





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Summary

- To study a super-massive black hole in the early Universe, a cosmological zoom simulation can be a compelling tool.
- With radiation feedback, the black hole accretion rate can be highly increased.
- The coloring technique enables us to understand the growth of the BH and galaxy by **studying detailed dynamics and physics of infalling gas**.