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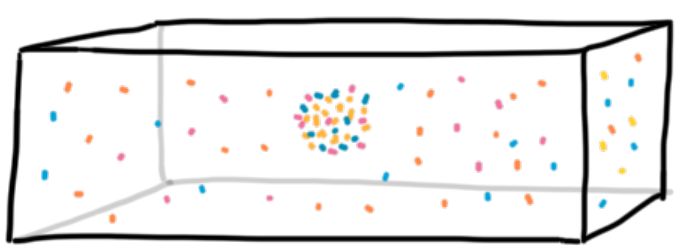
at UNIVERSITY OF SUSSEX

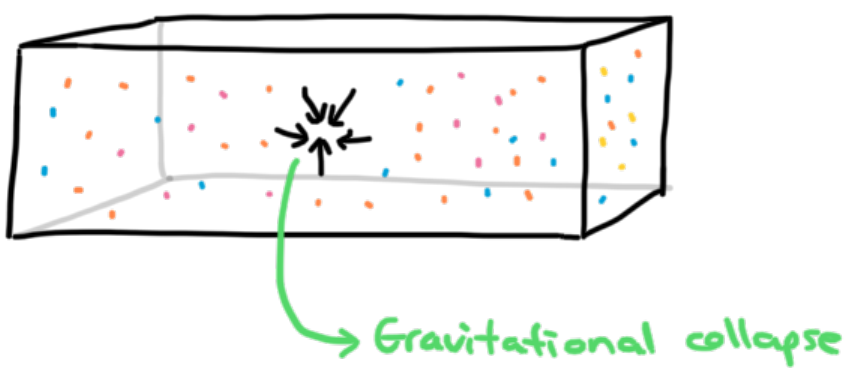
Primordial Black Holes in Braneworld Scenarios

... Primordial:

→ BH formation:



Enough matter within a volume in causal contact:



- Most well known BH formation mechanism:

Stellar collapse (astrophysics)

- 1966 - 1970 :

THE HYPOTHESIS OF CORES RETARDED DURING EXPANSION AND THE HOT COSMOLOGICAL MODEL

Ya. B. Zel'dovich and I. D. Novikov

Translated from Astronomicheskii Zhurnal, Vol. 43, No. 4,
pp. 758–760, July–August, 1966
Original article submitted March 14, 1966

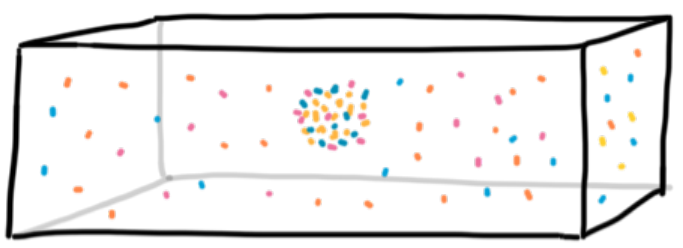
GRAVITATIONALLY COLLAPSED OBJECTS OF VERY LOW MASS

Stephen Hawking

(Communicated by M. J. Rees)

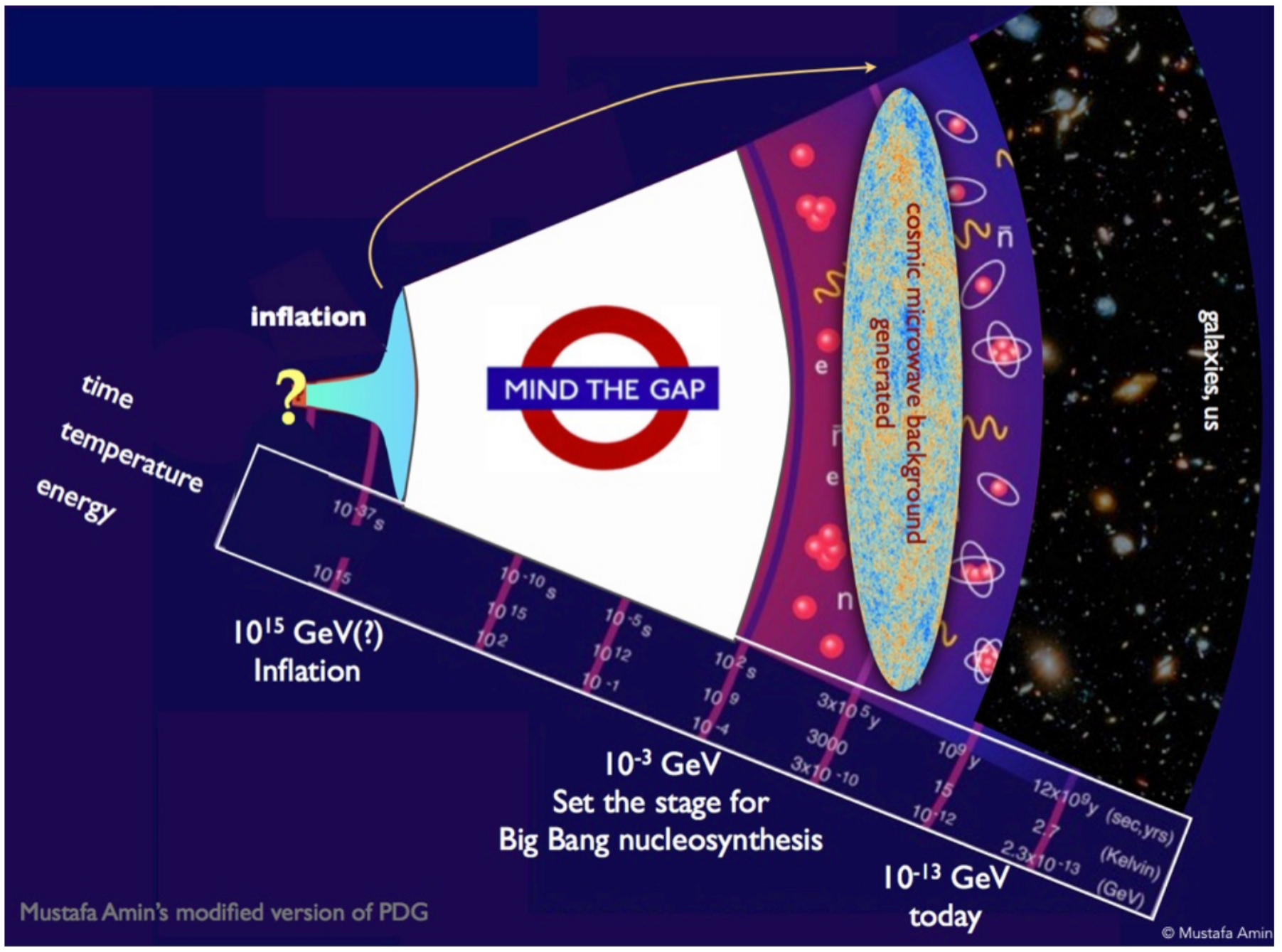
(Received 1970 November 9)

Early universe → "very" dense



Maybe these conditions take place and BHs form?

→ if we detect primordial black holes (PBHs), it would be a probe of the very early stages of the universe:



Since then → loads of papers → PBHs as a dark matter candidate?

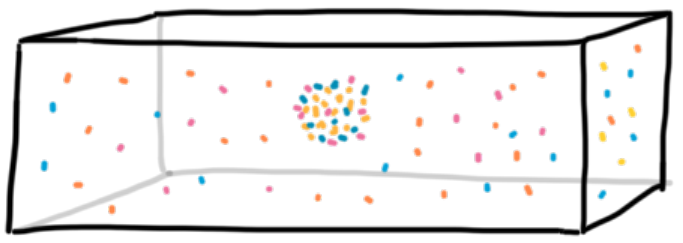
VERY INTERESTING!

our research:

Primordial Black Holes in Braneworld Scenarios

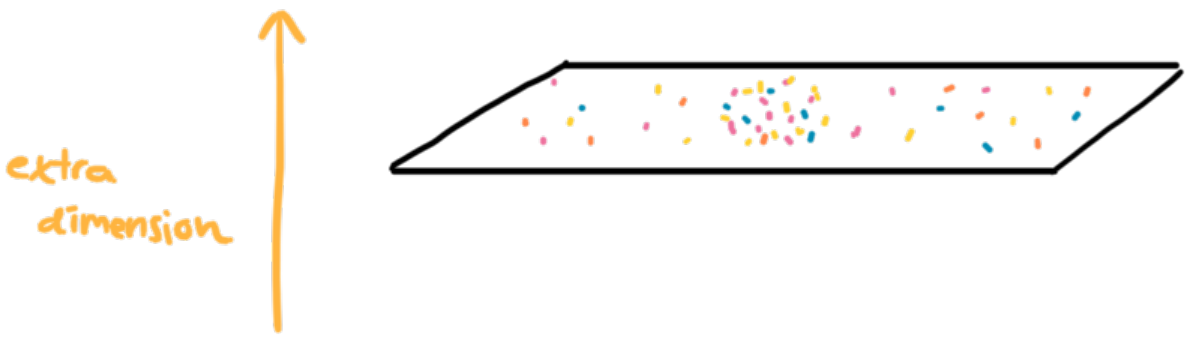
what if we live in a higher dimensional universe?

Standard description:



(3+1)-dimensional universe

Braneworlds:



(3+1)-hypersurface (brane)

↳ Gravitational collapse:

↳ For $M_{BH} < M_{critical}$, PBHs are 5-dimensional.

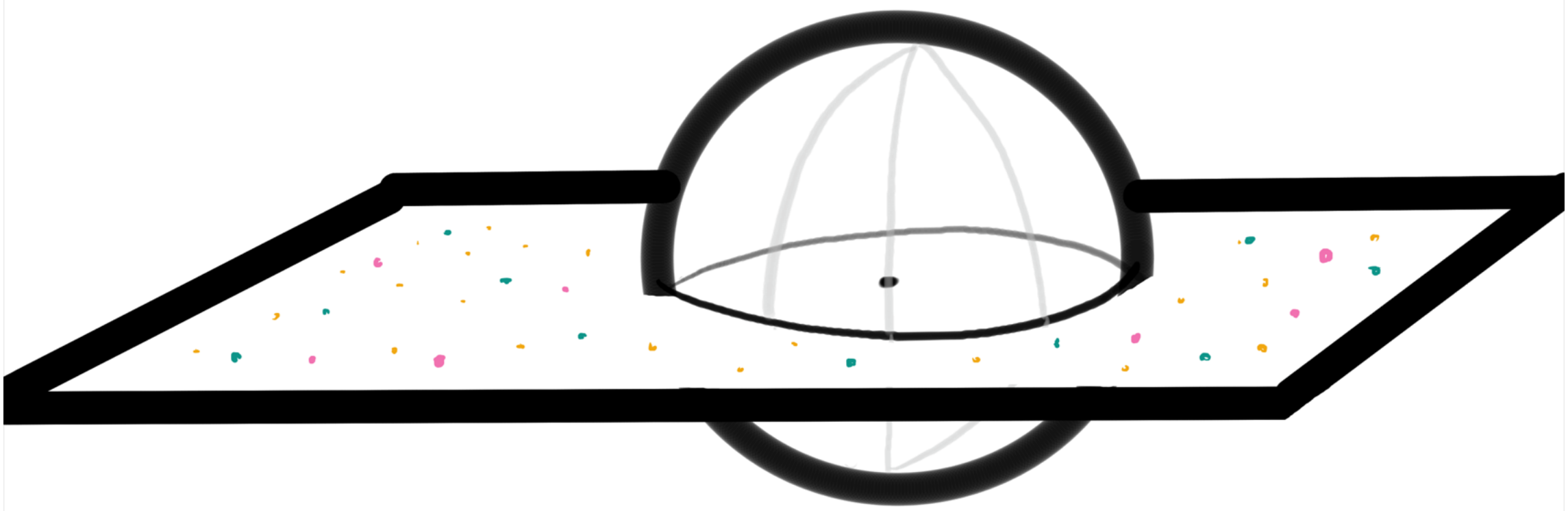
5-dimensional PBHs:

- Different geometry
- Different accretion
- Different spin evolution
- Different evaporation rate

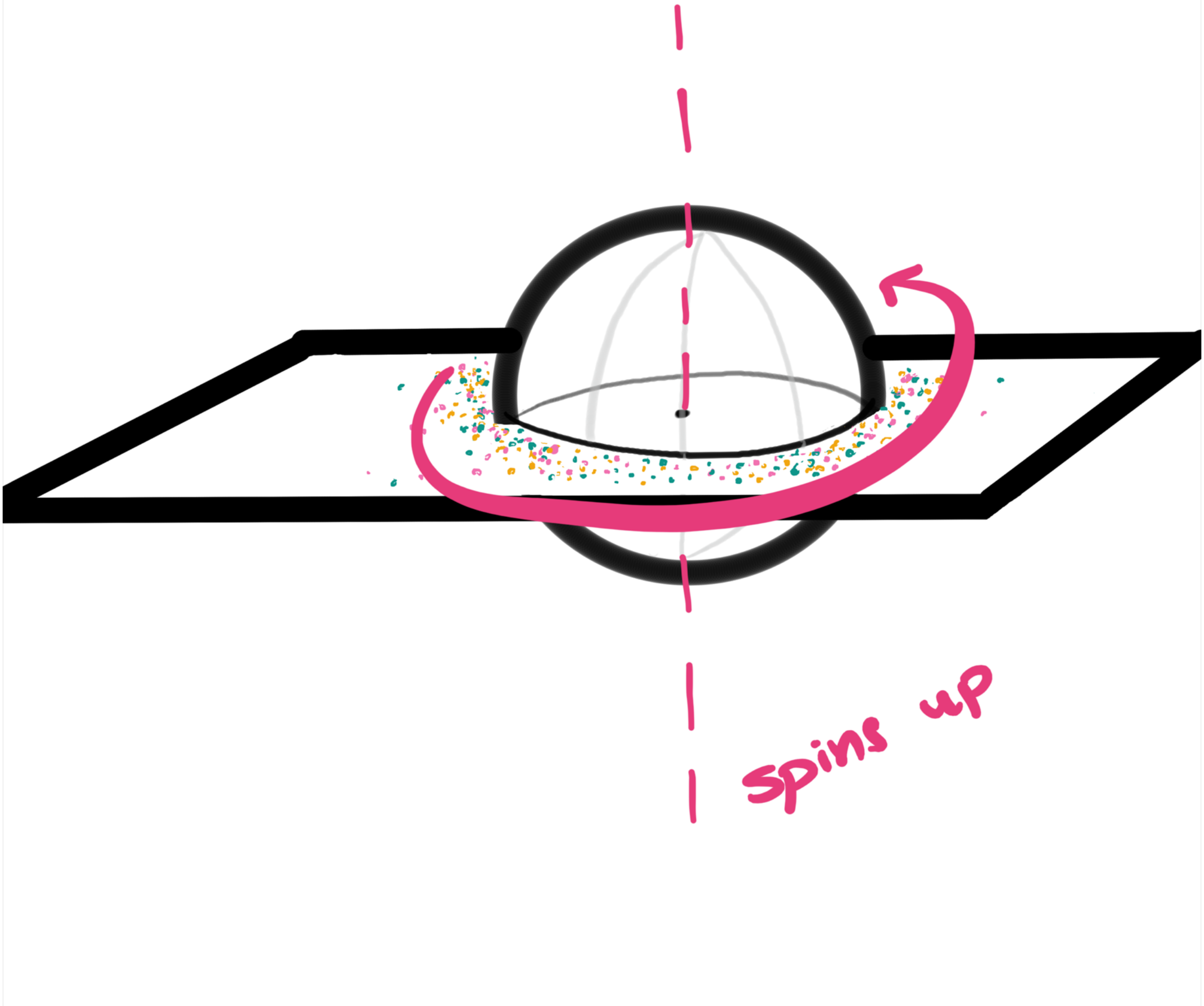
~~$R = \frac{2GM}{c^2}$~~

~~$H^2 \sim \rho$~~

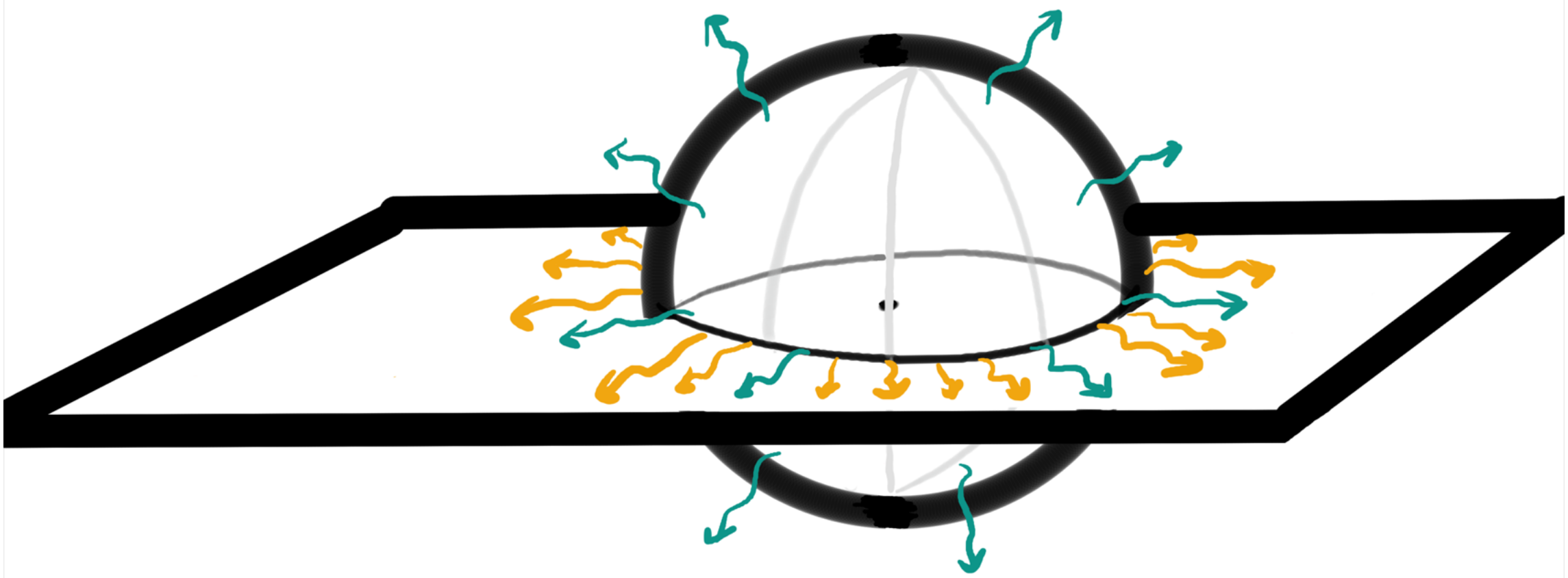
↳ enhanced accretion



Accretion disk:

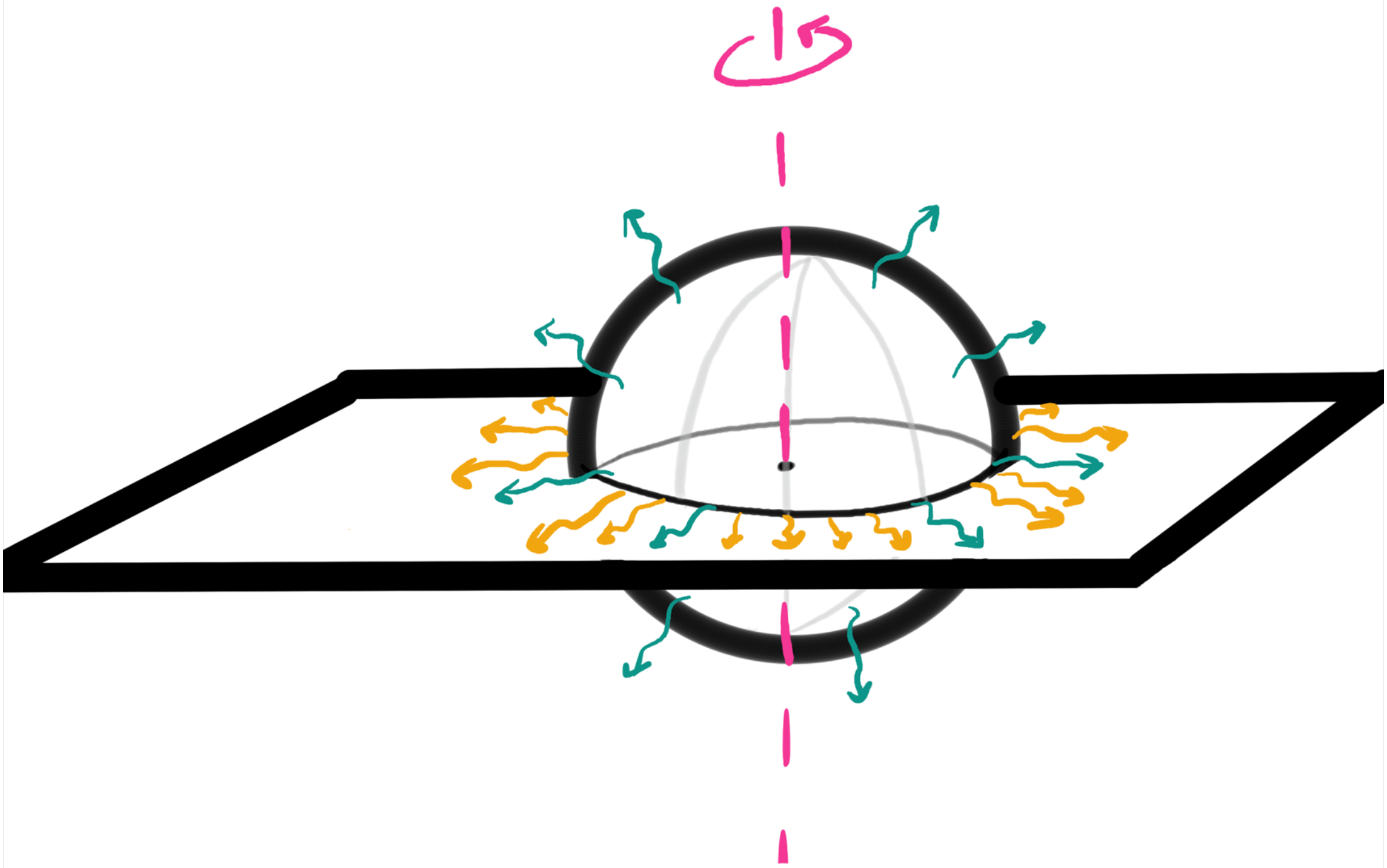


Evaporation:



→ BRANE EVAPORATION

→ BULK EVAPORATION



↳ some channels are enhanced.

To summarize:

↳ Many things to take into account !

Any questions → SLACK.

THANK YOU
FOR YOUR
ATTENTION