Kernel for Domination When the Stars Are Out

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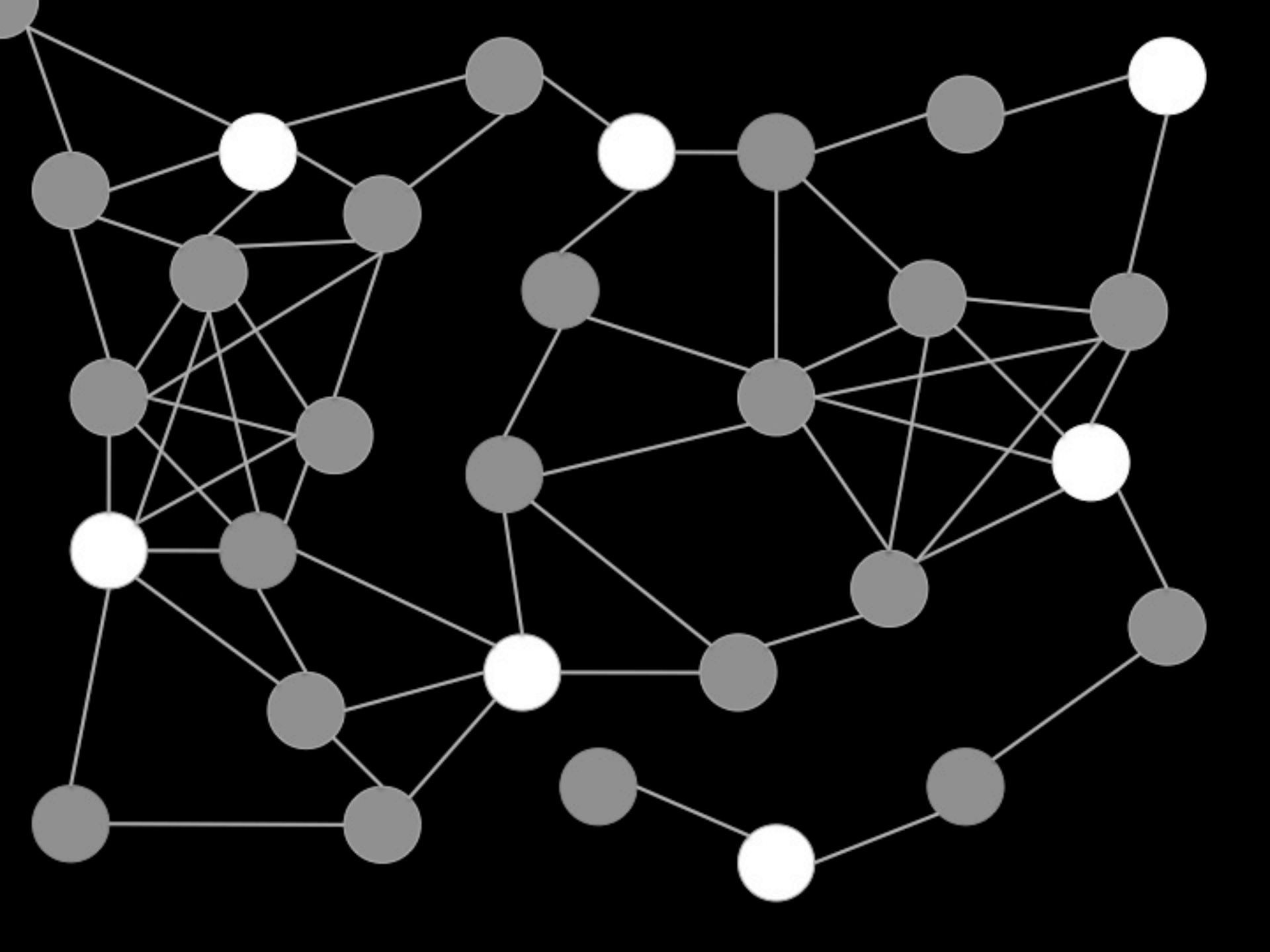
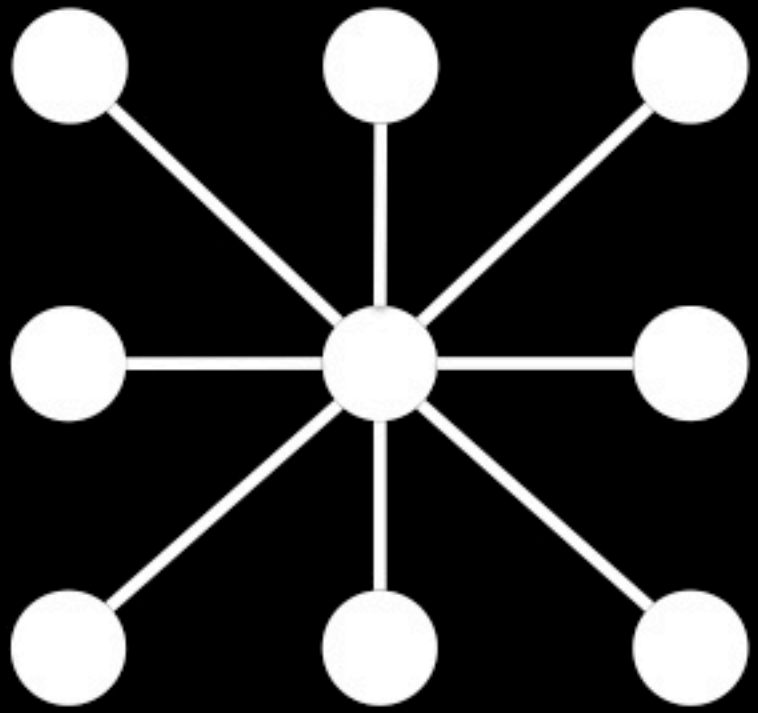
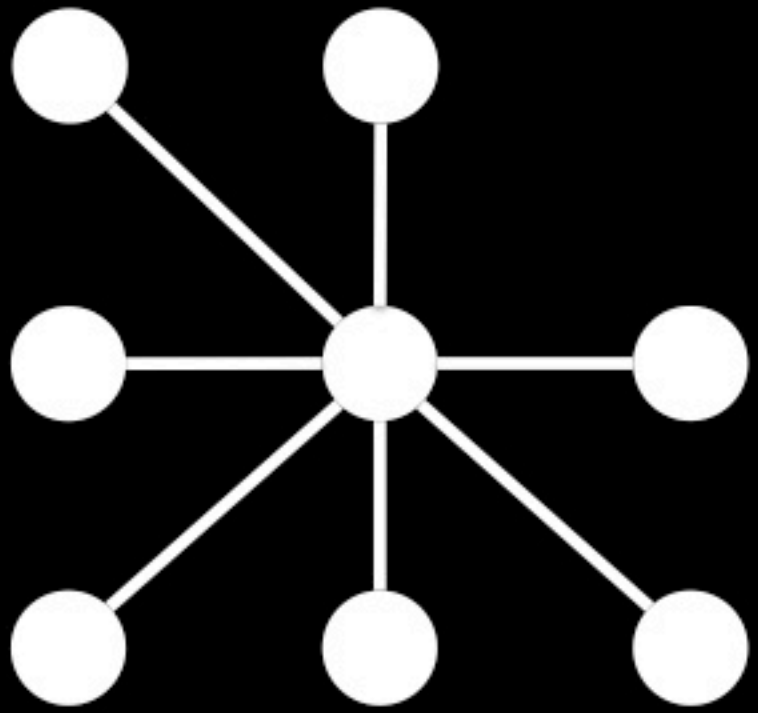
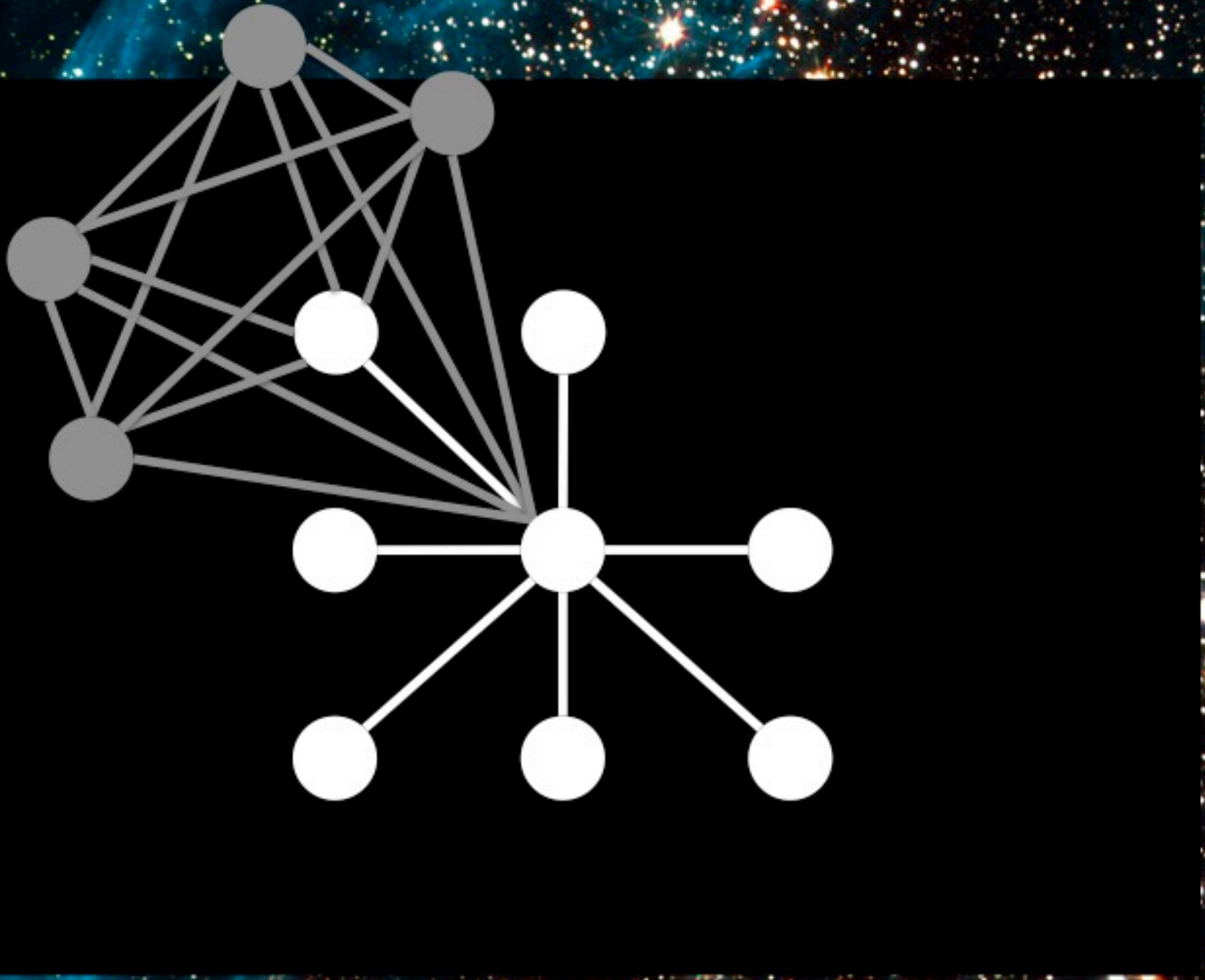
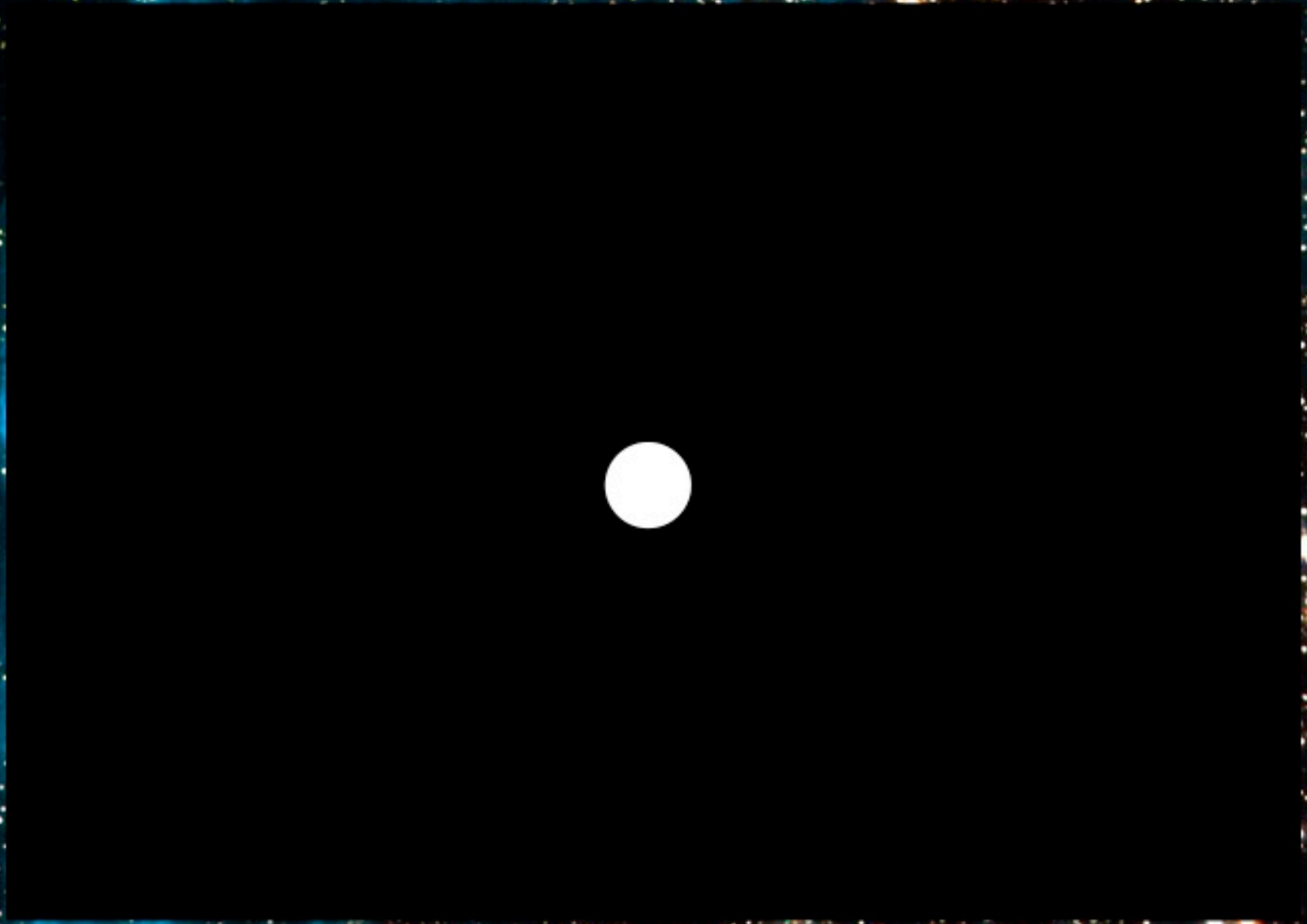
Introduction
Afterwards: kernel

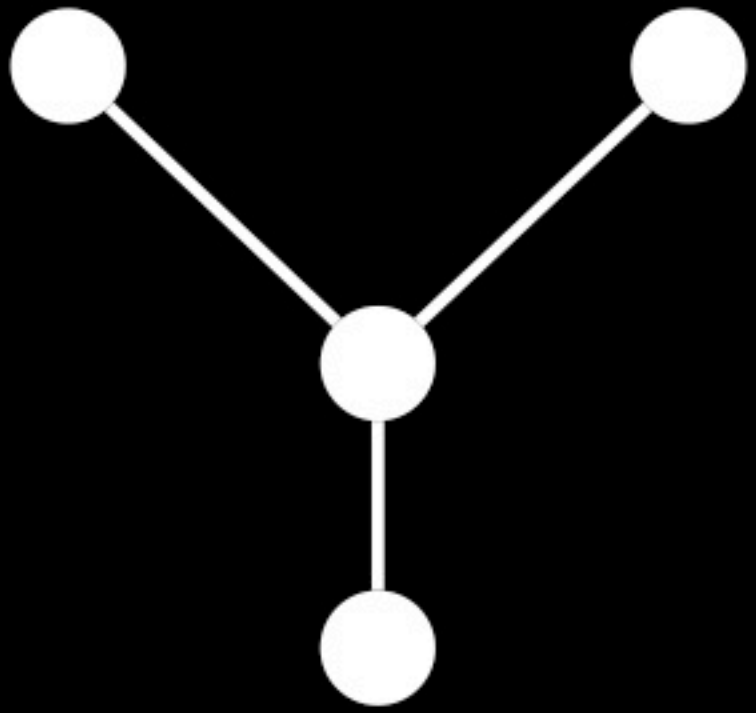


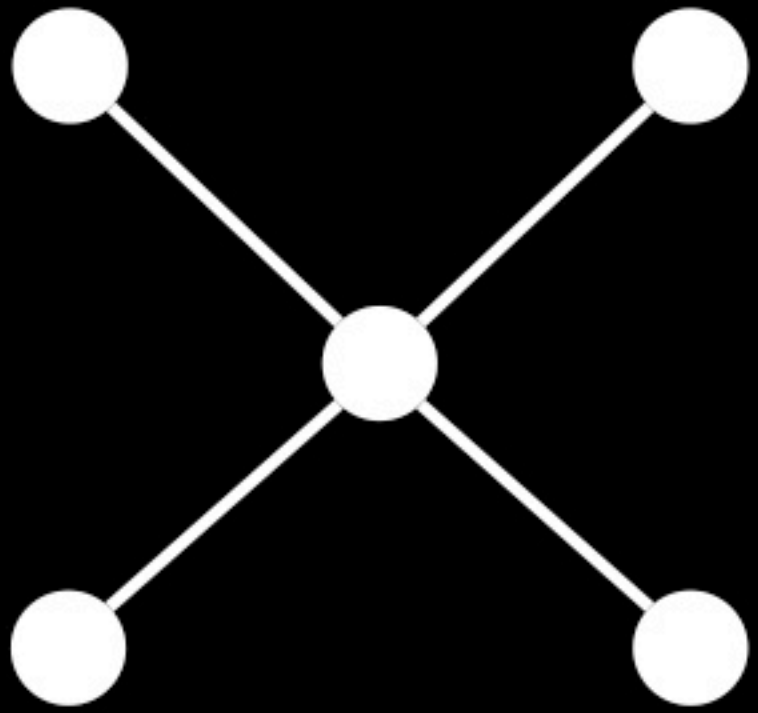




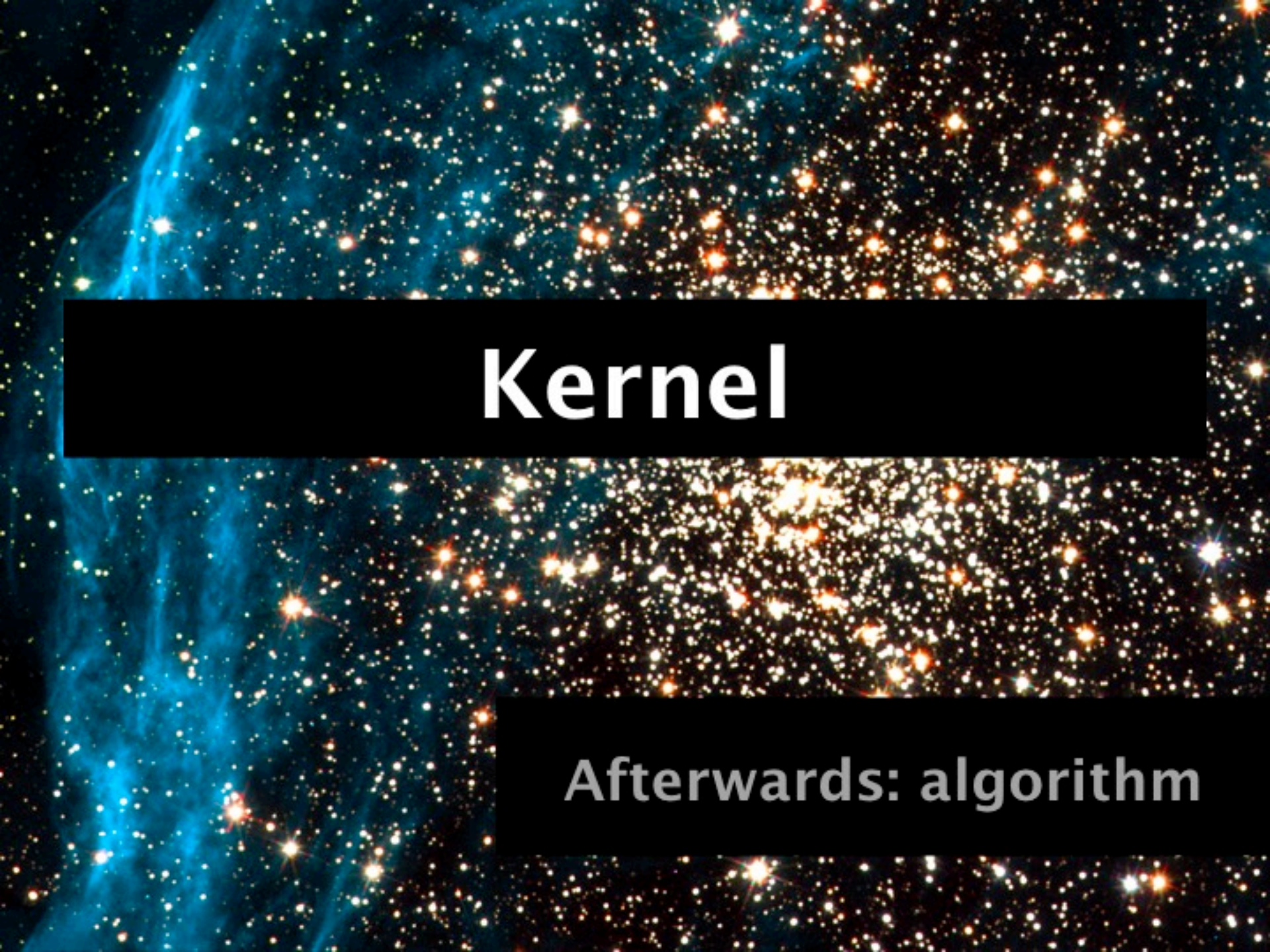






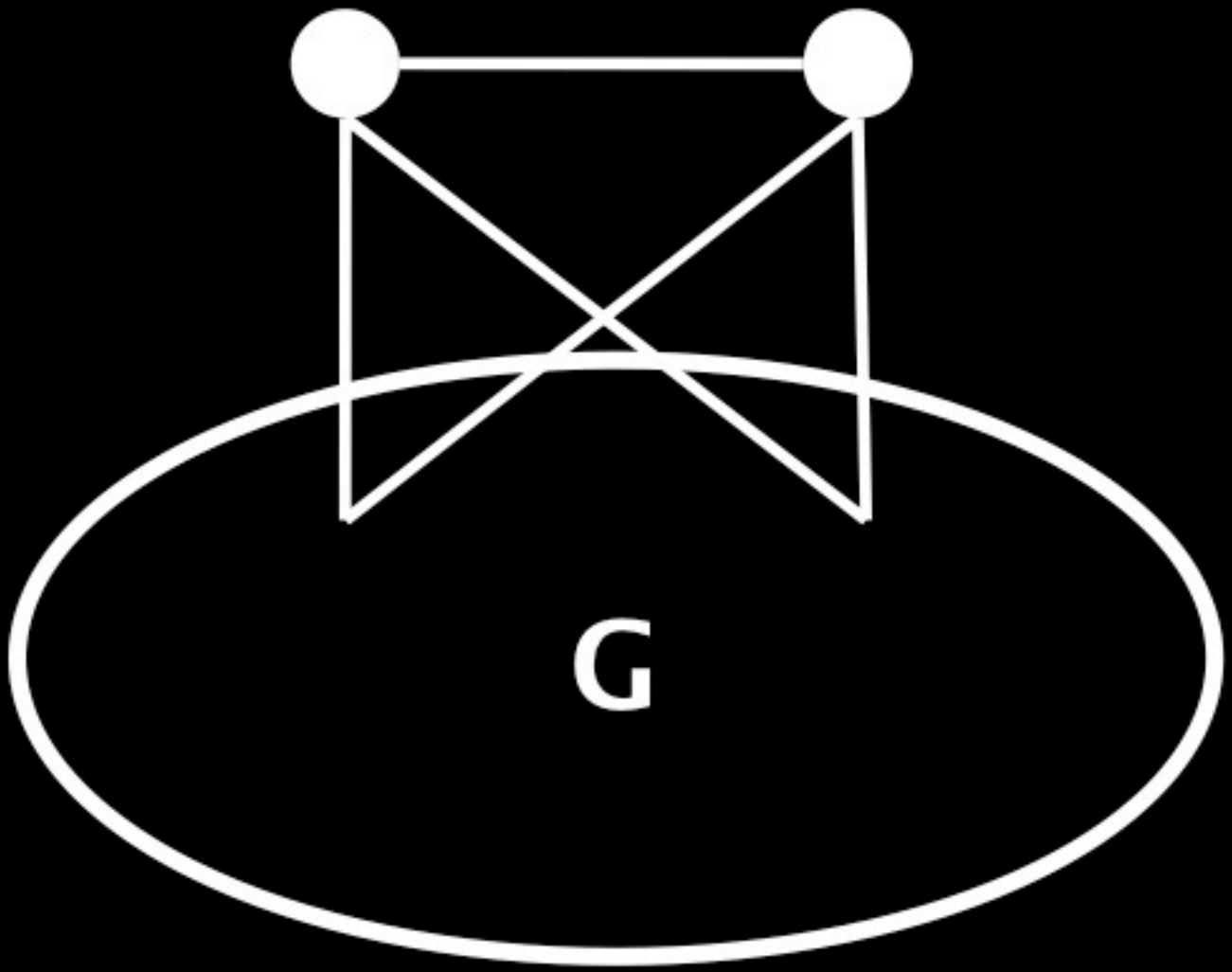


	K_1, $K_{1,1}$, $K_{1,2}$	$K_{1,3}$	$K_{1,4}$
Dominating Set	Trivial	NP-complete $9^k\, n^{O(1)}$ $O(k^4)$-kernel	NP-complete W[1]-hard
Connected Dominating Set	Trivial	NP-complete $36^k\, n^{O(1)}$ No poly kernel	NP-complete W[1]-hard


Kernel
Afterwards: algorithm

Nice claw-free graphs

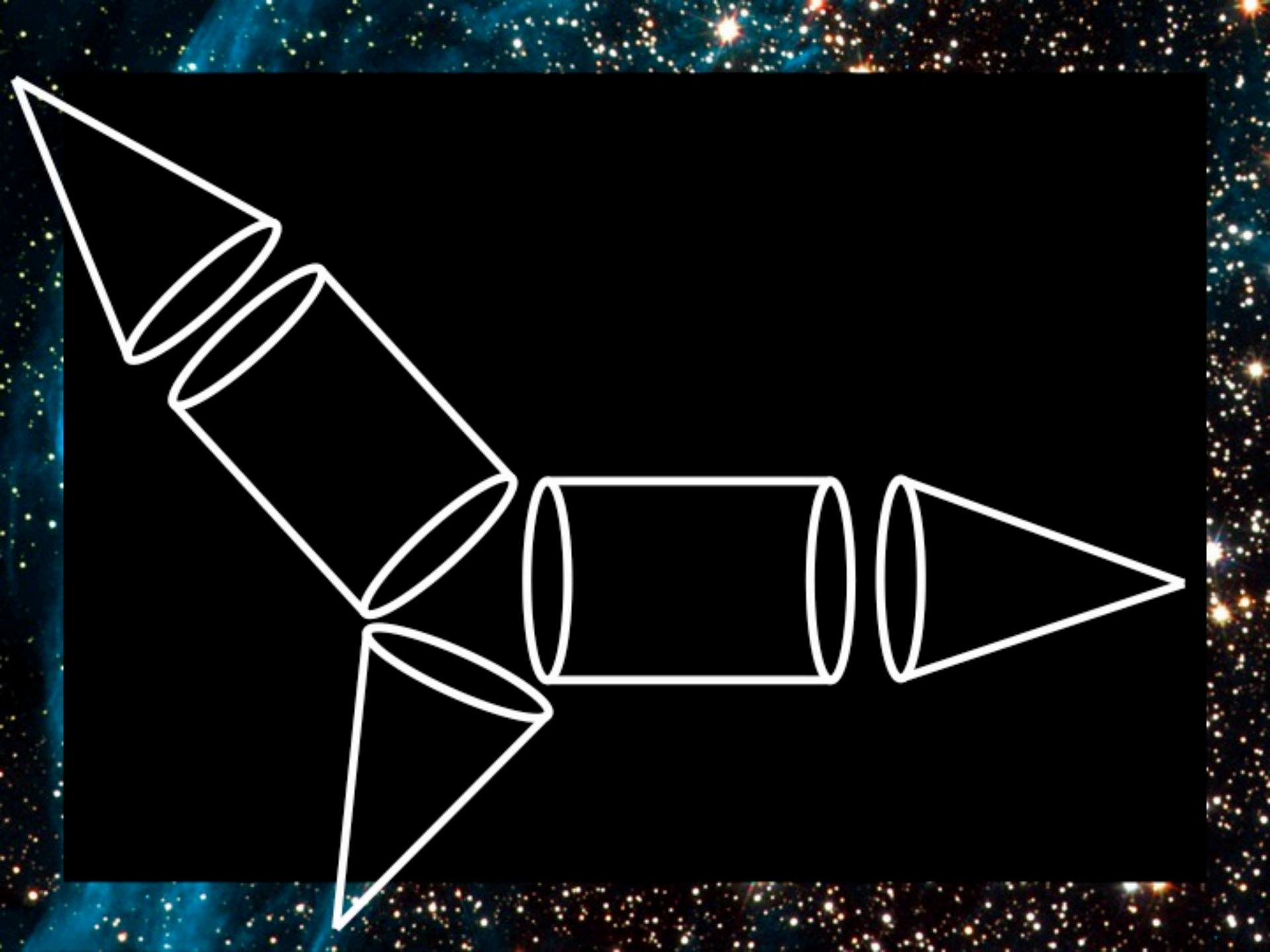
- should be claw-free
- should have $\alpha(G) > 3$
- should exclude certain structures


G

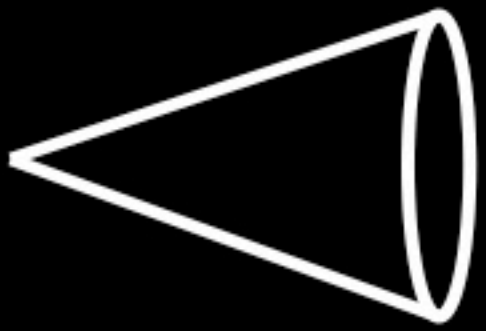
Nice claw-free graphs
What do you mean…nice?

Nice claw-free graphs

XX-graphs



Decomposition into strips

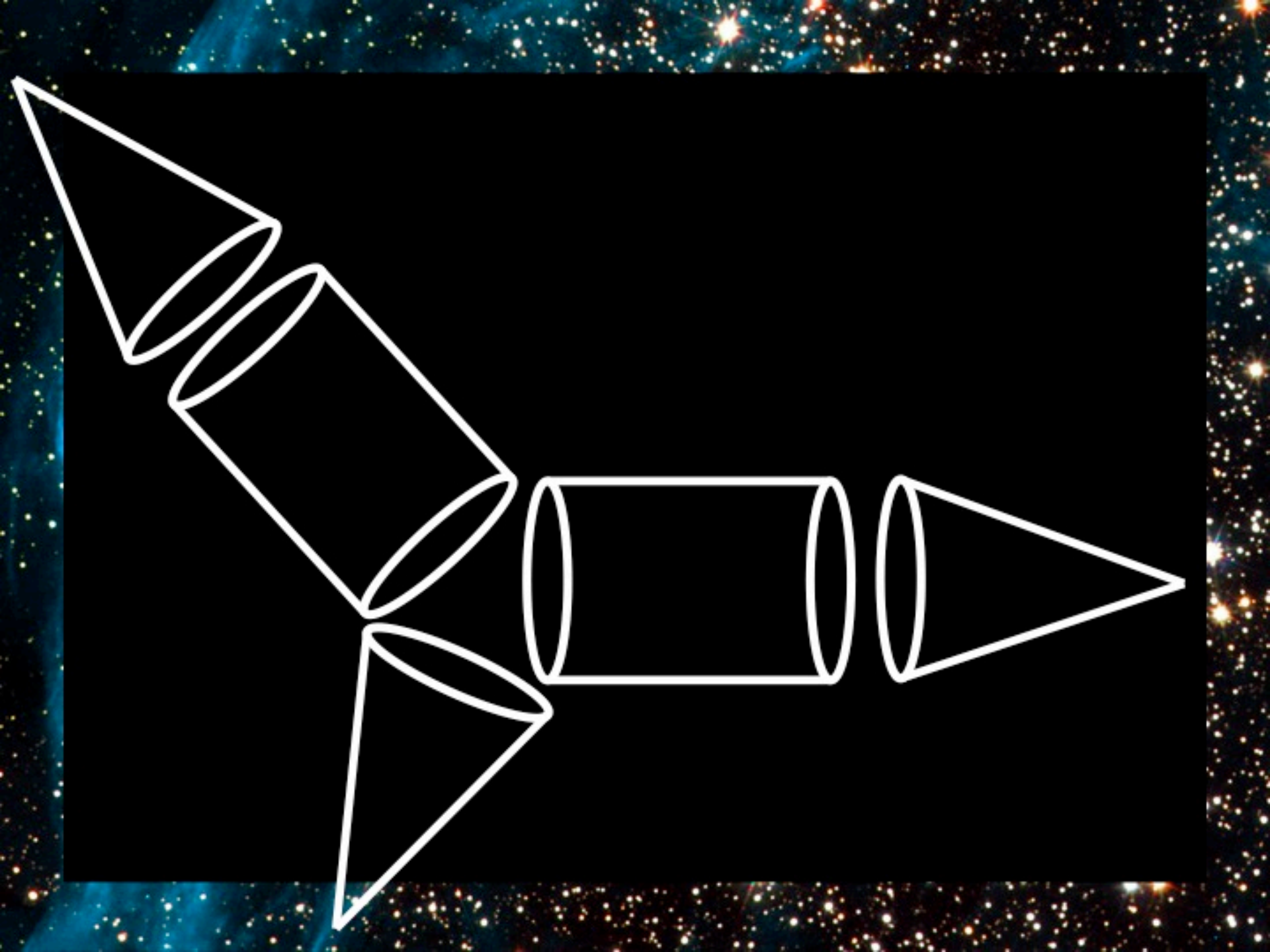


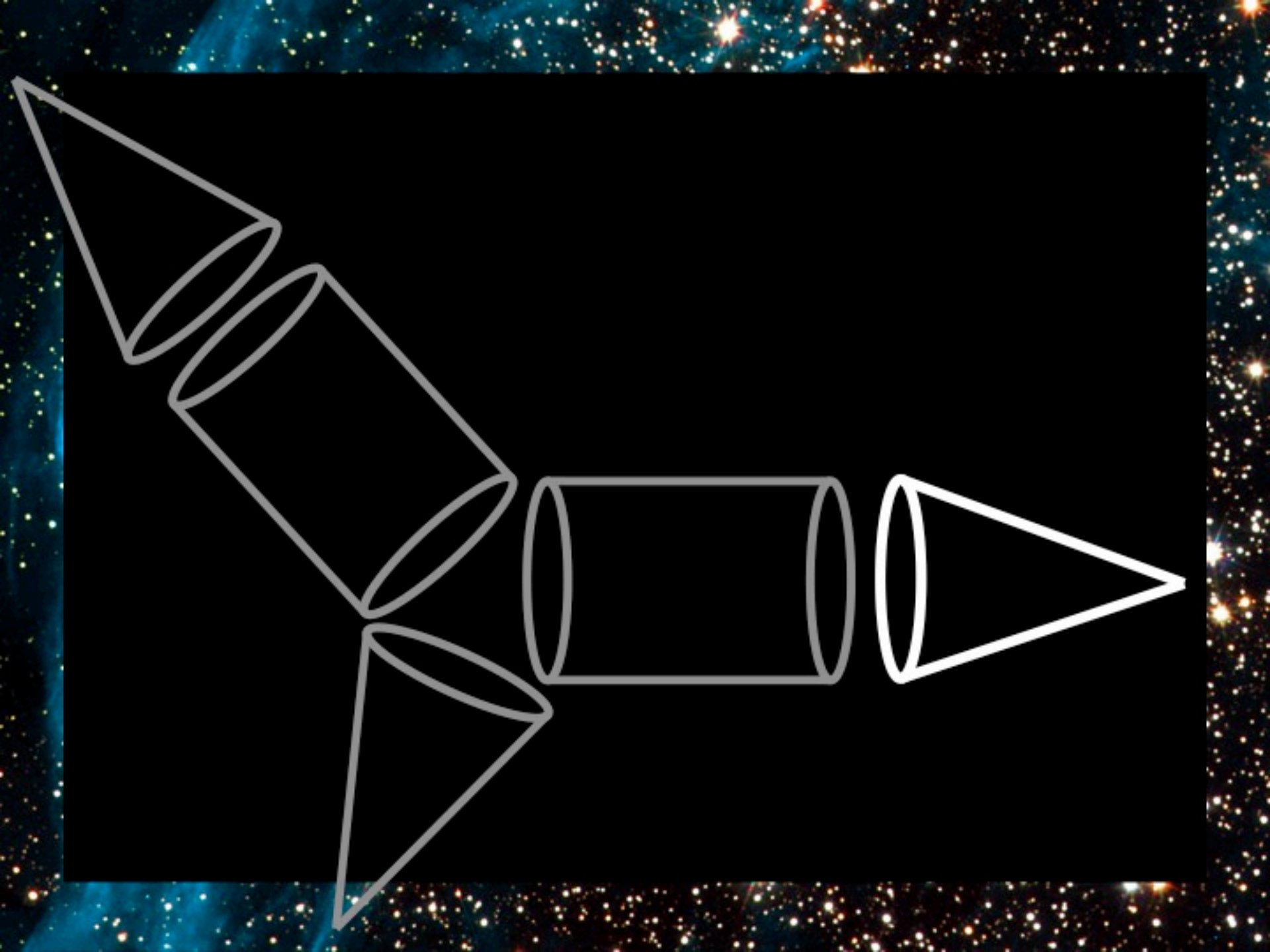
Proper interval graph

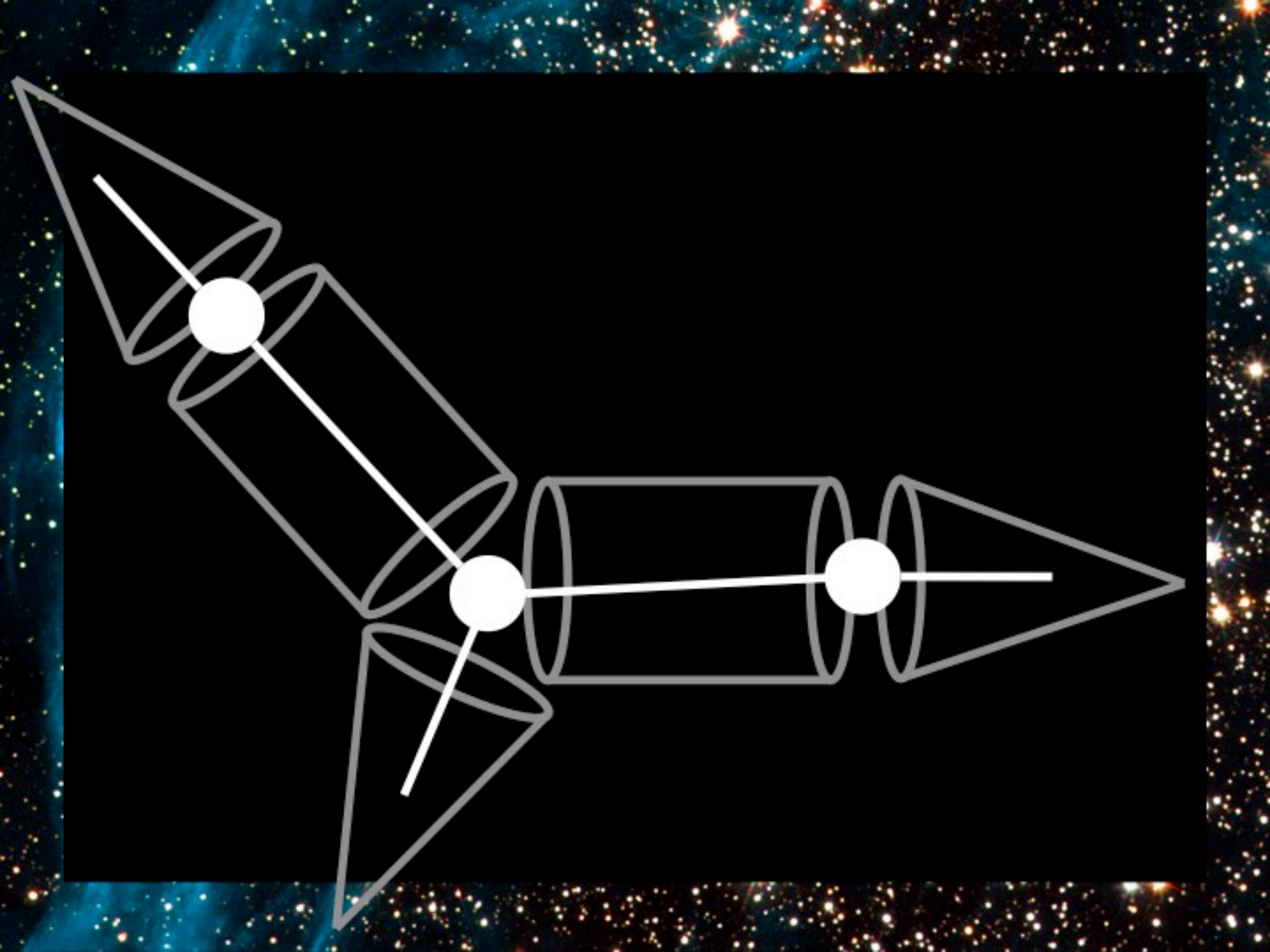
Spot

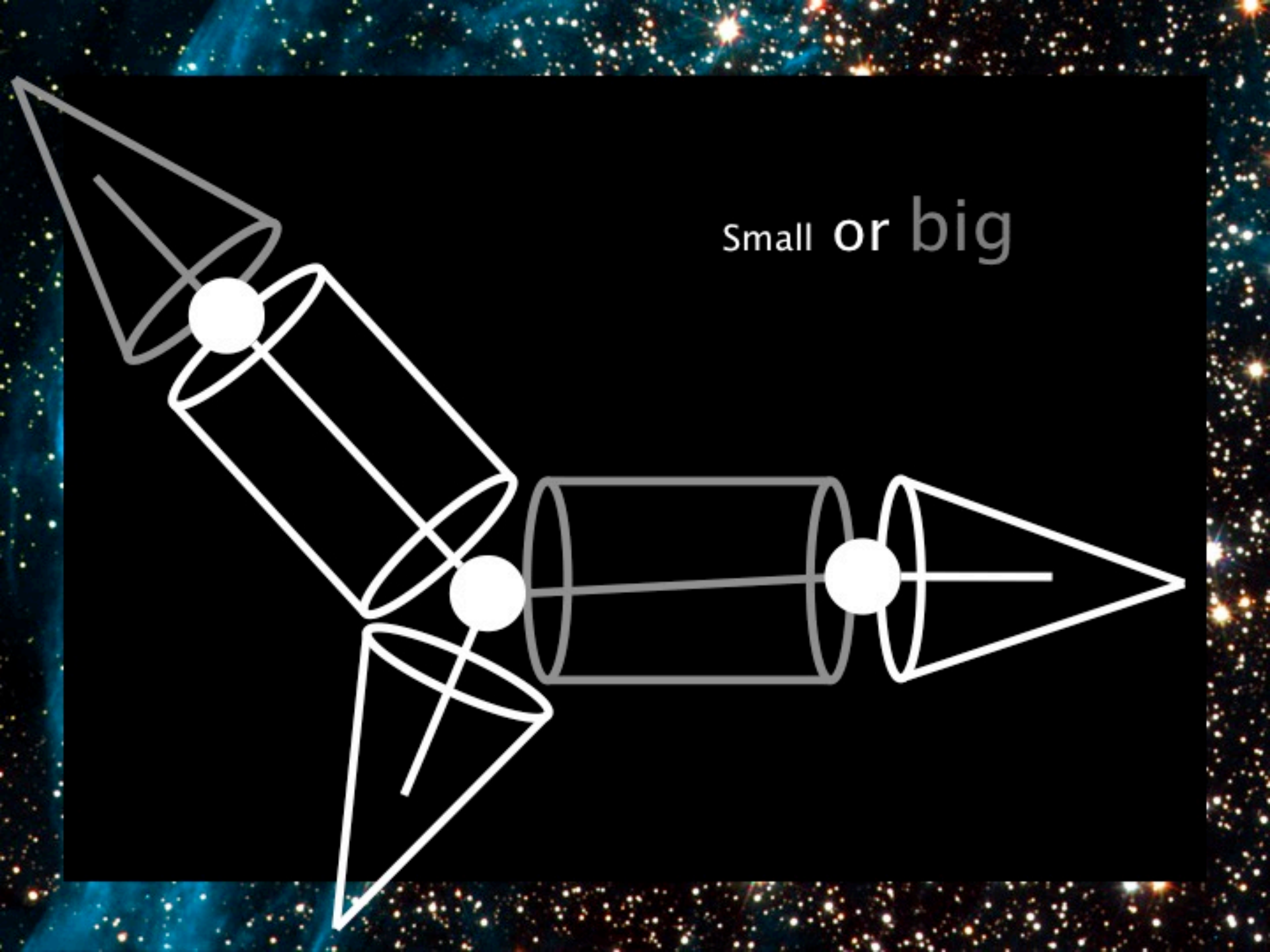
Proper circular-arc

…








Small or big

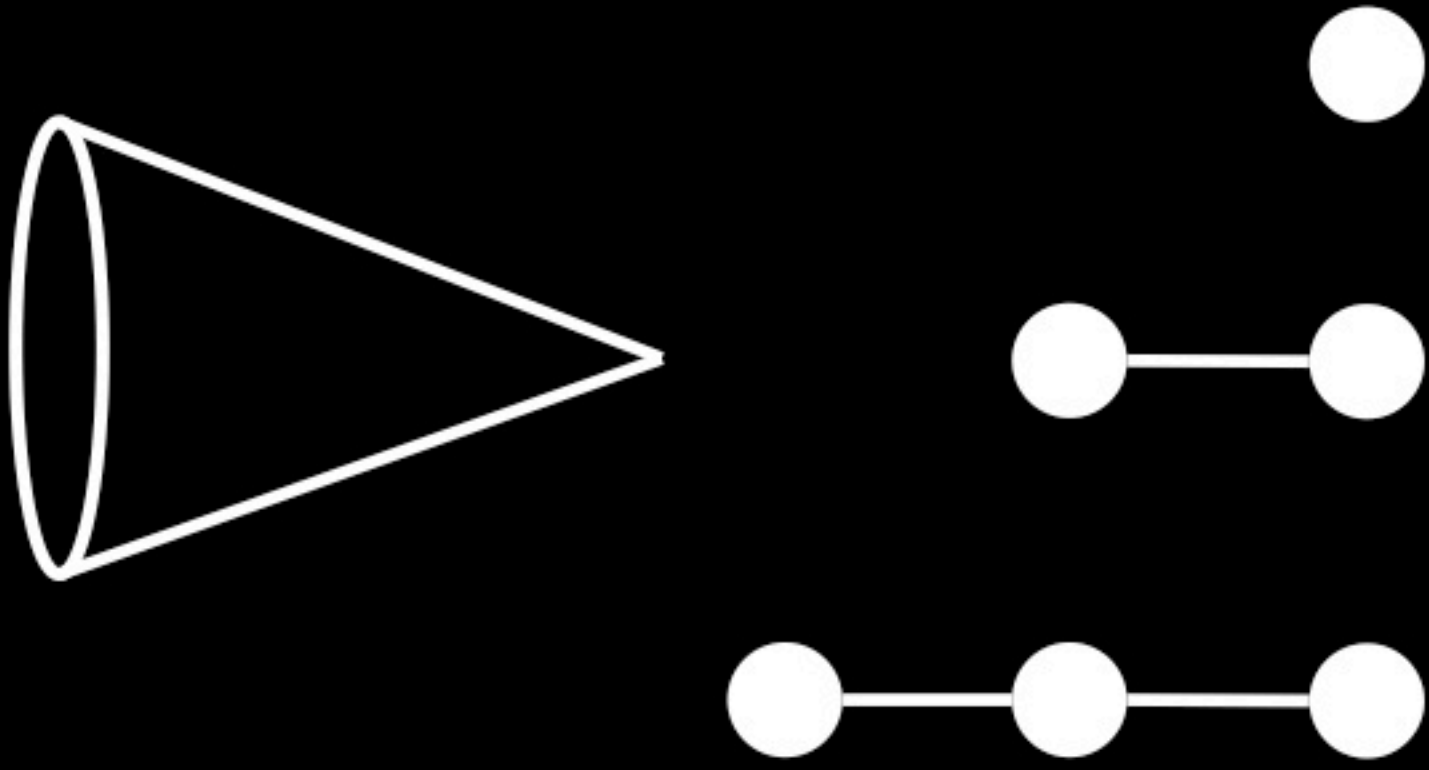
Small strips

- Induced part of strip graph has vertex cover of size 2k
  - -> Use Buss' kernel
  - -> Number of strips is $O(k^4)$

Big strips

- Induce 2k vertices in strip graph
  - -> Number of strips is $4k^2$

Make big strips less big



Influence of boundary

Difference at most 1

No jump

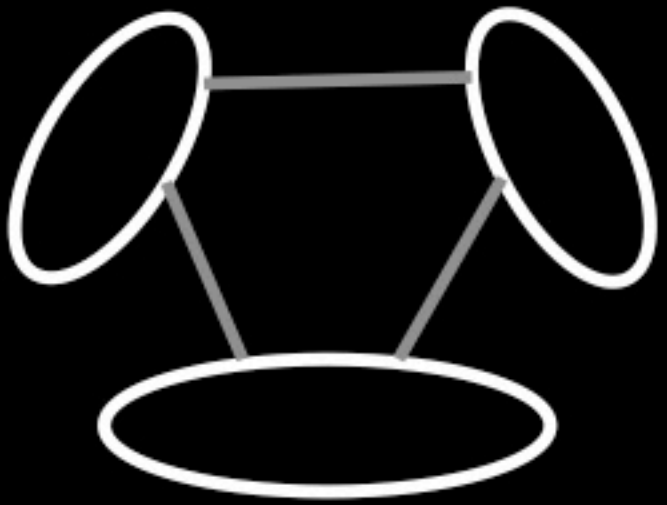
Jump:
(and reduce k)

What about tubes?

Case: unit interval graph

What about tubes?

Remaining cases



O(k⁴)-vertex kernel
Next: algorithm

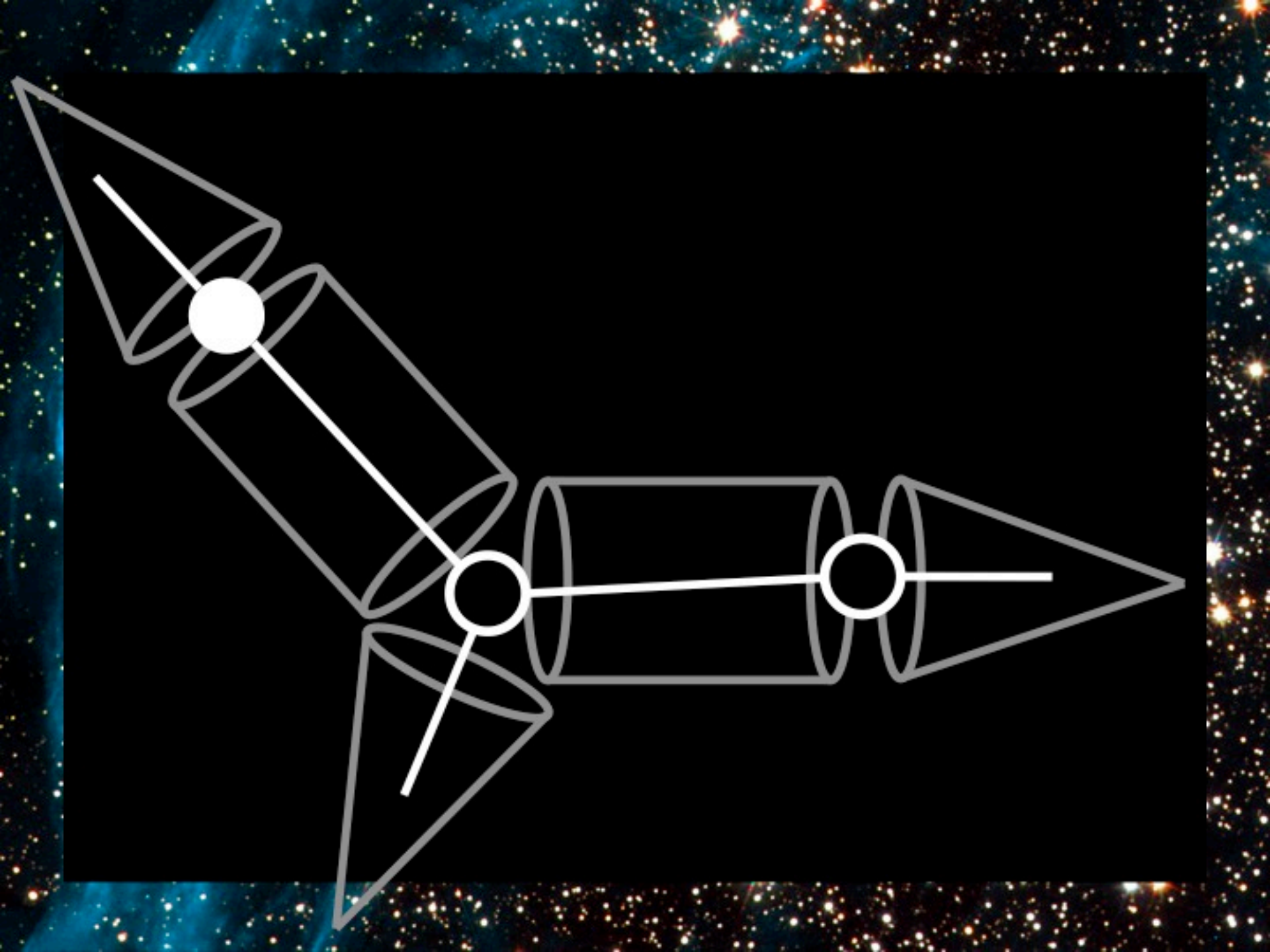
Want to guess which clique (vertex of strip graph) has vertex of optimal DS

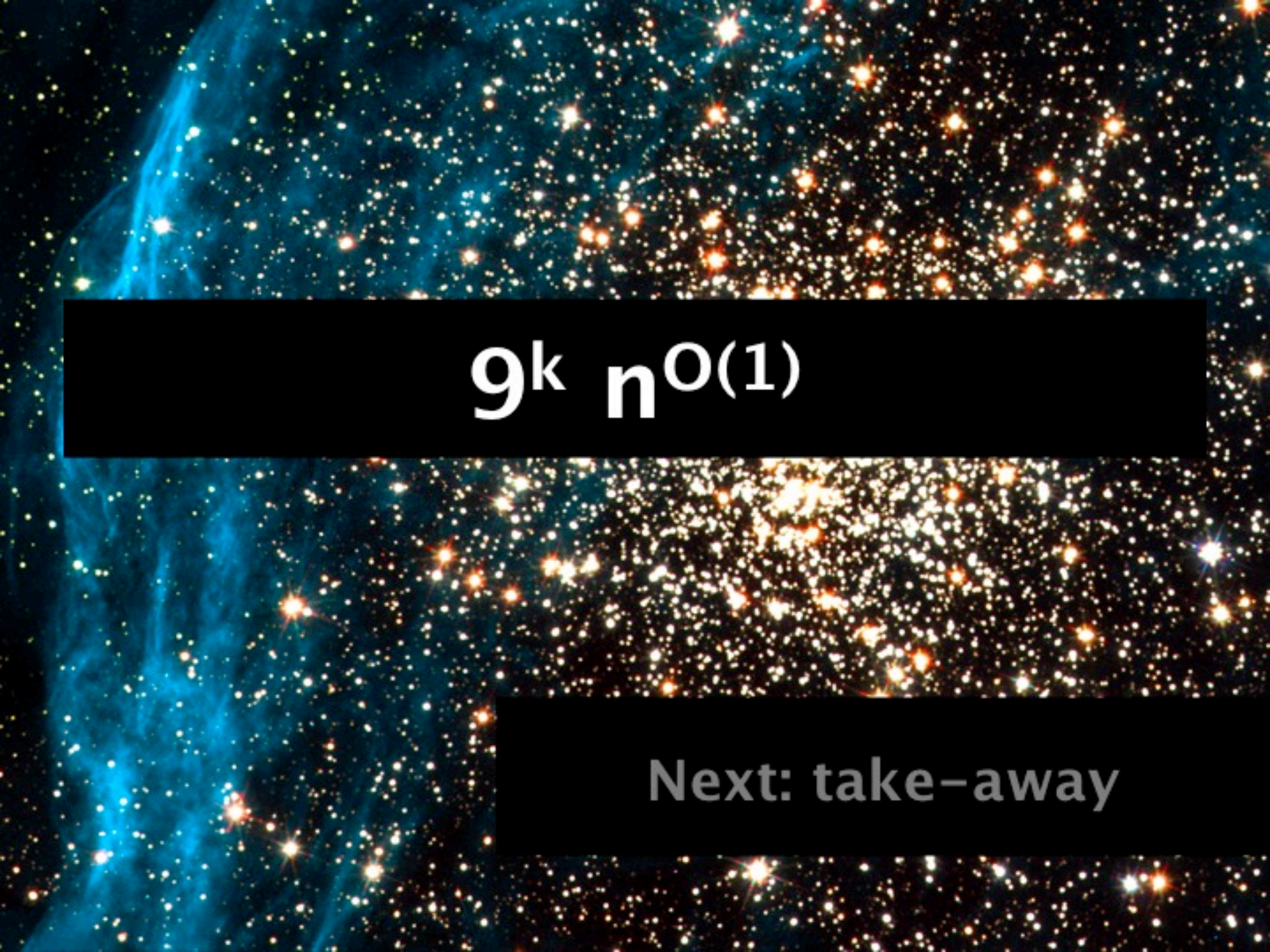
Big strips

- Induce 2k vertices in strip graph

Small strips

- Induced part of strip graph has vertex cover of size 2k




$9^k\ n^{O(1)}$
Next: take-away

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Questions?
Thank you!