



**Next Steps: Streaming**

• Approximate singular vectors in the row arrival model

• smaller space since a weaker model

- [Price '23] shows that if  $\sigma_1(A)/\sigma_2(A) \leq O(1)$ , then need  $\Omega(d^2)$  space to approximate top singular vector

- Price also shows that if  $\sigma_1(A)/\sigma_2(A) \geq C\sqrt{\log n \cdot \log d}$ , then can approximate top singular vector in  $O(d)$  space

- Can we relax the gap assumption?

- Can we assume random order or some benign conditions on  $A$  to obtain better algorithms?



# Next Steps : Streaming

- Approximate top singular vector in the row arrival model
  - Smaller space since a weaker model
- [Price '23] shows that if  $\sigma_1(A)/\sigma_2(A) \leq O(1)$ , then need  $\Omega(d^2)$  space to approximate top singular vector
- Price also shows that if  $\sigma_1(A)/\sigma_2(A) \geq C\sqrt{\log n \cdot \log d}$ , then can approximate top singular vector in  $O(d)$  space
- Can we relax the gap assumption?
- Can we assume random order or some benign conditions on  $A$  to obtain better algorithms?

# Query lower bounds for LRA

with David Woodruff [NeurIPS '23]