

QueryComplexity

• Access to data as it may be restricted for efficiency

• Query arbitrary entries

• Query matrix-vector products

• Query arbitrary *linear* measurements



A

(i, j)



$A_{i,j}$



v



Av



u



$$u^T A \leftarrow$$

$$= \sum_{i,j} S_{i,j} A_{i,j} = \langle \text{vec}(S), \text{vec}(A) \rangle$$

Measure



A

with



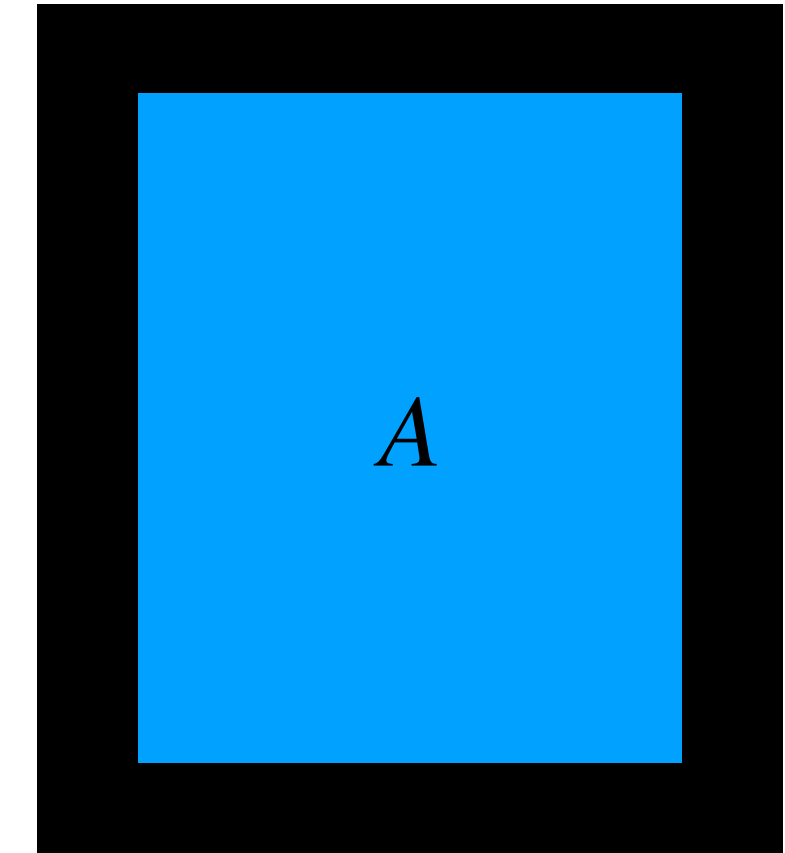
S

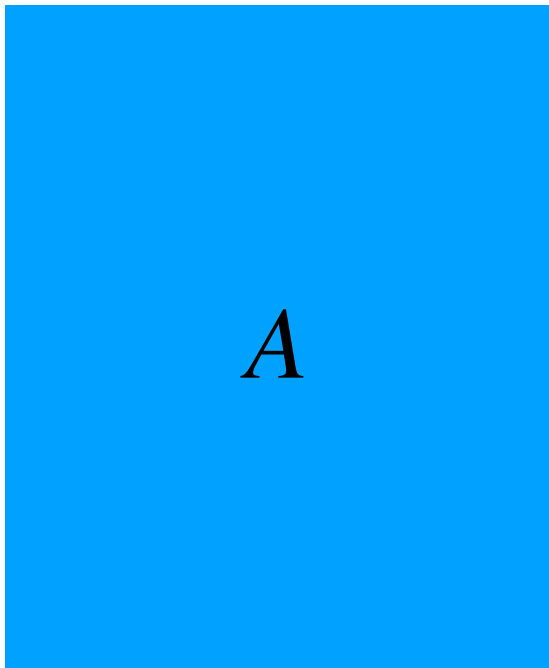
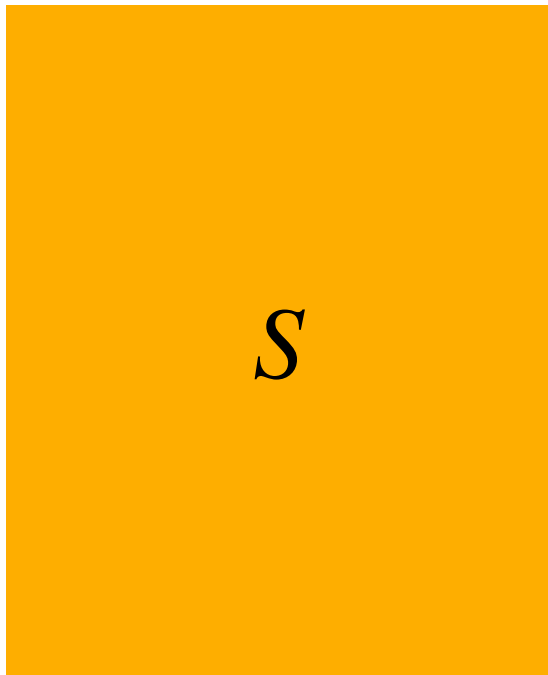
• How many queries do we need to solve a problem?



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Measure  with  $= \sum_{i,j} S_{i,j} A_{i,j} = \langle \text{vec}(S), \text{vec}(A) \rangle$

- How many queries do we need to solve a problem?

Fast and Space Optimal Streaming Algorithms

with Mikkel Thorup, Rasmus Pagh and David Woodruff [FOCS '23]