



**Our Results**

- **Theorem:** For  $p > 2$ , there is an algorithm using **optimal**  $\tilde{O}(n^{1-2/p})$  bits of space and an **update time** of  $O(1)$  to approximate  $F_p(x)$  up to constant factors

- Improves on  $\text{poly}(\log n)$  update time of earlier works such as [Andoni, Krauthgamer, Onak '10]

- **Theorem:** For  $0 < p < 2$ , can approximate  $F_p(x)$  up to  $1 \pm \varepsilon$  using **optimal**  $O(\varepsilon^{-2} \log n)$  bits of space and  $O(\log n)$  **update time**

- Improves on  $O(\log^2 n \log \log n)$  update time of [KNPW'11]

4

5

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