1077-68-1057   **Swastik Kopparty**, **Shubhangi Saraf** and **Sergey Yekhanin*** (`yekhanin@microsoft.com`),
1065 La Avenida, Mountain View, CA 94043. *High-rate Codes with Sublinear-time Decoding.*

Locally decodable codes are error-correcting codes that admit efficient decoding algorithms: They give a method to encode k-bit messages into n-bit codewords such that even after a constant fraction of the bits of the codeword get corrupted any bit of the original message can be recovered by only looking at $r(k)$ bits of the corrupted codeword. The tradeoff between the rate of a code and the locality/efficiency (the function $r(k)$) of its decoding algorithms has been studied extensively. However most prior work has focused on codes with very small r (e.g., constant functions), and the resulting constructions suffer from poor rate.

In this talk we give a new class of codes with very high rates (close to 1) and with strong local decoding properties $(r(k) = k^\epsilon)$, thereby giving new performance tradeoffs between the rate and locality of decoding. These codes, which we call multiplicity codes, are based on evaluating multivariate polynomials and their derivatives. Multiplicity codes extend traditional multivariate polynomial based codes; and at the same time achieve better tradeoffs and flexibility in the rate and decodability.

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