1163-68-303 **Jonathan Mosheiff**, **Nicolas Resch**, **Noga Ron-Zewi**, **Shashwat Silas** and **Mary Wootters***, marykw@stanford.edu. *LDPC Codes Achieve List-Decoding Capacity.*

We show that Gallager's ensemble of Low-Density Parity Check (LDPC) codes achieve list decoding capacity. These are the first graph-based codes shown to have this property. Previously, the only codes known to achieve list-decoding capacity were completely random codes, random linear codes, and codes constructed by algebraic (rather than combinatorial) techniques. This result opens up a potential avenue towards truly linear-time list-decodable codes which achieve list-decoding capacity.

Our result on list decoding follows from a much more general result: any local property satisfied with high probability by a random linear code is also satisfied with high probability by a random LDPC code from Gallager's distribution. Local properties are properties characterized by the exclusion of small sets of codewords, and include list-decoding, list-recovery and averageradius list-decoding. Along the way, we give a characterization of sets of codewords that are likely to appear in a random linear code, which may be of independent interest.

This is joint work with Jonathan Mosheiff, Nicolas Resch, Noga Ron-Zewi, and Shashwat Silas. (Received September 01, 2020)