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Jinha Kim, Ryan M. Martin, Tomas Masarik, Warren Shull, Heather C Smith*
(hcsmith@davidson.edu), **Andrew Uzzell** and **Zhiyu Wang**. *Local Dimension of a Poset*. Preliminary report.

The original notion of poset dimension is due to Dushnik and Miller (1941). In 2016, Uerckerdt proposed a variant, called local dimension, which has garnered considerable interest. A local realizer of a poset P is a collection of partial linear extensions of P that cover its comparabilities and incomparabilities. The local dimension of P is the minimum frequency of a local realizer where frequency is the maximum multiplicity of an element of P .

We survey a number of recent results for local dimension, highlighting the following. Hiraguchi (1955) proved that any poset with n points has dimension at most $n/2$, which is sharp. We prove that the maximum local dimension of a poset with n points is $\Theta(n/\log n)$. Our lower bound uses probabilistic methods to extend a theorem of Chung, Erdős, and Spencer (1983): There is an n -vertex bipartite graph in which each difference graph cover of the edges also covers one of the vertices $\Omega(n/\log n)$ times. (Received September 24, 2018)