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Kaviita Ramanan* (kavita_ramanan@brown.edu) and **Yin-Ting Liao**. *Random projections of high-dimensional measures: beyond universality*. Preliminary report.

The celebrated central limit theorem for convex sets states that most projections of any high-dimensional isotropic log-concave measure are close to Gaussian. More generally, it is known that if a high-dimensional measure satisfies the so-called thin shell condition, then most of its marginals are Gaussian. While these are beautiful universality results, they indicate that the fluctuations of lower-dimensional random projections do not provide much information about the high-dimensional measures. Motivated by this, we study non-universal large deviation properties of the projections. Specifically, we introduce a refined asymptotic thin shell condition for a sequence of measures and show that this implies that the corresponding sequence of random projections satisfies refined or sharp large deviations estimates. We also identify geometric information contained in these estimates, and construct importance sampling algorithms that allow one to more accurately estimate probabilities of interest. Finally, we verify the refined asymptotic thin shell condition for many high-dimensional measures of interest. (Received August 10, 2020)