1038-46-283 **Dmitriy Bilyk*** (bilyk@math.gatech.edu), School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332, and **Michael Lacey** and **Armen Vagharshakyan**. *Discrepancy, small ball probabilities and entropy estimates.*

We discuss the relation between the lower bounds for the discrepancy function of a finite sequence in a unit cube, probabilities of small deviations for the Brownian sheet, and asymptotic behavior of covering numbers of certain Sobolev-type spaces. All these questions revolve around one inequality – a lower bound for the L^∞ norm of 'hyperbolic' sums of Haar functions. We improve the previously known results in all of the aforementioned subjects in dimensions $d \geq 3$. (Received February 12, 2008)