1024-11-18   **Michael T Lacey*** (`lacey@math.gatech.edu`), Math, Georgia Tech, Atlanta, GA 30332.
Estimates of the Discrepancy Function in Orlicz spaces close to L^1.

Let $\mathcal{A}_N$ to be N points in the unit cube in dimension d, and consider the Discrepency function

$$D_N(\vec{x}) = \sharp \mathcal{A}_N \cap [\vec{0}, \vec{x}) - N|[\vec{0}, \vec{x})|$$

Here, $\vec{x} = (x_1, \ldots, x_d)$ and $[0, \vec{x}) = \prod_{t=1}^d [0, x_t)$. We show that necessarily

$$\|D_N\|_{L^1 (\log L)^{(d-2)/2}} \gtrsim (\log N)^{d/2}.$$

In dimension $d = 2$, the 'log L' term has power zero, which corresponds to a Theorem due to Halasz. (Received November 06, 2006)