Harmonic measure in parabola-shaped regions in $\mathbb{R}^n$

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Abstract: We will be concerned with the sharp rate of decay of harmonic measure in a solid of revolution arising from the curve $y = x^\alpha$, $x > 0$. Here $0 < \alpha < 1$ and, more precisely, we seek the rate of decay of the harmonic measure of the exterior of a ball of radius $r$ as $r$ increases.

In the case of two dimensions, classical conformal mapping estimates of Ahlfors and Warschawski yield precise results. This method will be described in detail. We will then view the $n$-dimensional harmonic measure problem as a 2-dimensional problem but for an operator that is no longer the Laplacian, and show how the classical method can be adapted to deal with this more general situation. A number of difficulties arise, whose solutions will be sketched.