On existence of Stein kernels, and monotonicity properties

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A Stein kernel, when it exists, leads to a dimension-free estimate on how similar its corresponding probability measure is to gaussian. Although the general question of existence remains open, we show that existence is guaranteed when the probability measure in question satisfies a converse-weighted Poincaré inequality. As an application, we obtain a CLT in W_2 distance which is optimal in terms of both rate and dimension. In a different direction, we establish certain strong monotonicity properties of the so-called Stein discrepancy on sums of independent random vectors. This draws yet another nice parallel between Stein discrepancy, entropy and Fisher information. Based on joint work with Max Fathi.