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**Ronald R. Coifman\*** (coifman@math.yale.edu). *Empirical intrinsic geometry as a tool for invariant parameter extraction.*

We show that we can recover both a Riemannian manifold and corresponding Langevin Dynamics from temporal observations of nonlinear transformations of stochastic Langevin trajectories. We apply this methodology to solve inverse acoustic problems as well to extract slow parameters in complex chemical reactions. (Received October 02, 2013)