1094-37-238 **Rafael de la Llave** and **Nikola P Petrov*** (npetrov@ou.edu), Department of Mathematics, University of Oklahoma, 601 Elm Avenue, Norman, OK 73034, and **Arturo Olvera**. *Shadowing with localization, and applications to renormalization.*

We present a quantitative shadowing theorem that works for infinite dimensional discrete dynamical systems that are not necessarily invertible. The theorem does not require that the pseudo-orbit considered is hyperbolic, but only approximately so. It obtains localization properties: if the pseudo-orbit fails to be an orbit at some isolated times, the changes needed to make it an orbit are exponentially localized around these times; similarly for the approximately hyperbolic properties. The main technical tool to verify the hypothesis of the shadowing theorem is a delicate "lambda-lemma" that works in the generality considered.

As an application, we show that, if a map in a Banach space has two hyperbolic fixed points p_{A} and p_{B} such that the unstable manifold of each point intersects transversely the stable manifold of the other, then there exist orbits that stay close to the fixed points for any sequence of times we want.

Using this application for renormalization group operators, we show that some geometric properties of the renormalization-group dynamics (heteroclinic intersections of invariant manifolds of fixed points) imply certain asymptotic relations among universal scaling exponents – a fact observed numerically by the authors. (Received August 25, 2013)