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**John M Neuberger\*** ([john.neuberger@nau.edu](mailto:john.neuberger@nau.edu)), Department of Mathematics and Statistics, Box 5717, Northern Arizona University, Flagstaff, AZ 86011, and **Jeffrey Springer**. *Numerical Solutions of Semilinear Elliptic PDE on Manifolds*. Preliminary report.

We extend the Gradient Newton Galerkin Algorithm (GNGA) to semilinear elliptic PDE on manifolds. In particular, we apply our methods by first finding an orthonormal basis of eigenfunctions of the Laplace-Beltrami operator for any given manifold. In this preliminary report, we consider several simple manifolds where the eigenfunctions are known in closed form, and then discuss the Closest Point (CP) method as a means to find a suitable basis for other manifolds. After obtaining these eigenfunctions, we construct bifurcation diagrams corresponding to a family of superlinear PDE. (Received July 25, 2011)