1135-65-2781 **Martin Licht***, Department of Mathematics, The University of California, San Diego, 9500 Gilman Dr, # 0112, La Jolla, CA 92093, and **Michael Holst**, Department of Mathematics, The University of California, San Diego, 9500 Gilman Dr, # 0112, La Jolla, CA 92093. *Towards Finite Element Methods over Manifolds via Coordinate Charts.*

We present some results concerning finite element methods for partial differential equations over manifolds. Our approach transforms partial differential equations of tensor fields from a physical manifold to parametric coordinate charts. The parametric problems involve smooth coefficients, which lead to a variational crime in practical finite element methods. Only recent results in approximation theory rigorously prove optimal error estimates. In this talk we use the case of Euclidean domains as a demonstrative example and relate our approach to computational practices in engineering and physics. (Received September 26, 2017)