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and **Daniel Freeman**. *Continuously Moving Parseval Frames on Smooth Manifolds*. Preliminary report.

Moving bases on manifolds are important in the study of differential geometry and are applied in mathematical physics, but moving bases do not exist on all manifolds, for instance, the sphere. An alternative to a moving basis is a Parseval frame of unit-length vectors. We examine the existence of such frames on the Möbius strip, the Klein bottle, and  $n$ -dimensional spheres. We prove the existence of a continuously moving, unit-length Parseval frame on  $S^n$  when  $n$  is an odd integer. More generally, we investigate the relationship between the existence of a nowhere zero vector field and that of a continuously moving Parseval frame of unit length. One potentially useful tool in studying this relationship is the frame force associated with the frame potential. To better understand this possible method, we are led to a study of the dynamical properties of the frame force. (Received July 26, 2010)