1016-35-70 **Stephen C. Preston*** (preston@math.sunysb.edu), Department of Mathematics, Stony Brook, NY 11794-6351. *Conjugate points on volumorphism groups.*

On a finite-dimensional Riemannian manifold, the points conjugate to a given point along a given geodesic have finite multiplicity and form a discrete set. In infinite dimensions, one can get infinite multiplicity and/or clustering of conjugate points (e.g., on an ellipsoid in Hilbert space). However, a natural example of an infinite-dimensional manifold is the volume-preserving diffeomorphism group of a finite-dimensional Riemannian manifold, which arises in the context of ideal fluid mechanics. For a 2-sphere, the conjugate points along a rotation form a discrete set, so that it looks like finite-dimensional Riemannian geometry. For a 3-sphere, the conjugate points along a rotation all have infinite multiplicity and fill up the interval $[\pi, \infty)$. I will discuss these examples and how they generalize, and what these phenomena might mean for fluid mechanics. (Received January 30, 2006)