1106-35-1149 **Jesse Ratzkin*** (jesse.ratzkin@uct.ac.za) and **Tom Carroll** (t.carroll@ucc.ie).

Eigenvalues of moving domains in Riemannian manifolds of nonpositive curvature.

Let (M, g) be a complete Riemannian manifold with nonpositive sectional curvature, and let Ω be a (sufficently small) domain with compact closure. If Ω moves with velocity $e^w \eta$, where η is the unit outward normal of $\partial\Omega$, then $\Omega_s \subset \Omega_t$ for $s < t$. Thus domain monotonicity implies $\lambda(t) = \lambda(\Omega_t)$ is a decreasing function, where λ is the first Dirichlet eigenvalue of the Laplace-Beltrami operator. We give an lower bound for this rate of decrease. Our estimate is isoperimetric, in that equality forces Ω to be isometric to a round ball in Euclidean space. We will also present some results comparing λ before and after a conformal diffeomorphism, which one can view as an extension of the classical Schwarz lemma in complex analysis. Our main result applies to any geometric flow, under appropriate convexity hypotheses, and appears to be new even if the ambient manifold is a Euclidean space. (Received September 11, 2014)