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**David Constantine\*** ([constand@umich.edu](mailto:constand@umich.edu)), Department of Mathematics, 2074 East Hall, 530 Church Street, Ann Arbor, MI 48109. *Ergodic Frame Flow and Rank Rigidity*.

Rank rigidity problems deal with the characterization of locally symmetric spaces via particular geometric properties, namely higher (geometric) rank. In various curvature settings, higher Euclidean, hyperbolic and spherical rank have been shown to imply that a space is locally symmetric. I will present the following result for negatively curved manifolds having higher hyperbolic rank: If  $M$  is negatively curved (with curvature pinched sufficiently tightly for even dimensional  $M$ ) and along every geodesic in  $M$  there exists a parallel vector field making constant curvature  $-1$  with the geodesic direction, then  $M$  is hyperbolic. When the curvature of  $M$  is bounded above by  $-1$  this provides a new proof (subject to the pinching in even dimension) of Hamenstädt's hyperbolic rank rigidity theorem. When  $-1$  is the lower curvature bound this result is new and is the first positive result for a lower curvature bound. The main tool of the proof is the dynamics of the frame flow as developed by Brin, particularly Brin's geometric description of the ergodic components for this flow. (Received January 22, 2007)