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Iosif Polterovich (iossif@dms.umontreal.ca), Département de mathématiques, Université de Montréal, CP 6128 succ. Centre-Ville, Montreal, QC H3C 3J7, Canada, and **David A. Sher*** (dsher@umich.edu), Department of Mathematics, University of Michigan, 2074 East Hall, 530 Church Street, Ann Arbor, MI 48109-1043. *Heat invariants of the Steklov problem.*

We study the heat invariants associated to the Steklov eigenvalue problem on a Riemannian manifold with boundary. Using the Seeley calculus, we prove a general structure theorem for these invariants. We also compute the first few heat invariants explicitly, which identifies several new Steklov spectral invariants. In particular, we prove that the total mean curvature is a Steklov spectral invariant whenever the dimension of the manifold is at least 3. As an application, we prove global Steklov spectral rigidity for a ball in \mathbb{R}^3 : if a compact domain in \mathbb{R}^3 with smooth connected boundary has the same Steklov spectrum as a ball, then it is a ball. (Received August 13, 2013)