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**Yuchin Sun\*** (yuchin@uchicago.edu), UC SANTA CRUZ, 1156 HIGH STREET, SANTA CRUZ, santa cruz, CA 95064. *Morse Index Bound of Minimal Two Spheres.*

Finite-dimensional Morse theory was developed to study geodesics. Index of a critical point of a Morse function reflects its topology. A natural extension of finite-dimensional Morse theory will be a Morse theory for harmonic spheres. We prove that given a Riemannian manifold of dimension at least three, with a generic metric and nontrivial homotopy group  $\Pi_3$ , there exists a collection of finitely many harmonic spheres whose sum of areas realizes the width with Morse index bound one. Moreover, under the assumption of strong convergence, the Morse index conjecture is true, which means that there exists a harmonic sphere whose Morse index is one. (Received August 28, 2019)