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Giuseppe Martone* (gmartone@usc.edu), University of Southern California, and **Tengren Zhang**, California Institute of Technology. *Positively ratioed representations and length functions in higher rank.*

For a compact surface S with negative Euler characteristic, Hitchin and maximal representations are well studied higher rank analogues of Teichmüller space. In this setting, one can define many length functions generalizing the hyperbolic length on S . For a representation ρ and a length function ℓ , we will define what it means to be a (ρ, ℓ) -positively ratioed representation. This is a sufficient condition for the existence of a shortest non-peripheral simple closed curve on S . We relate the length of such curve to the topological entropy of the representation. The main tool is a construction of a measure on the space of geodesics of S associated to a (ρ, ℓ) -positively ratioed representation. This is joint work with Tengren Zhang. (Received July 15, 2016)