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*Length-spectral rigidity for flat metrics.*

Fix a surface  $S$  with a negatively curved metric and consider the marked length spectrum of all closed curves. These length data uniquely determine the metric among all negatively curved metrics on  $S$ , by a theorem of Otal. For metrics of constant negative curvature, the situation is much more rigid: it suffices to record the lengths of simple closed curves (and in fact, just  $6g - 5$  curves will do for the surface of genus  $g$ ). In joint work with Leininger and Rafi, we consider the rigidity of the length spectrum for singular flat metrics (semi-translation structures) on  $S$ , and give a complete solution describing which simple curve sets are rigid. (Received September 21, 2009)