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Given a smooth Riemannian manifold  $(M, g)$ , the primitive length spectrum is the collection of all lengths of primitive closed geodesics counted with multiplicity. Recently, Lafont and McReynolds showed that the primitive length spectrum of arithmetic hyperbolic 2- and 3-manifolds contain arbitrarily long arithmetic progressions. Further, they conjecture that this is in fact a characterization of arithmeticity of  $M$ . In this talk, we discuss to what extent this property of arithmetic progressions characterizes arithmeticity in the case of closed hyperbolic surfaces. The goal is to show that there are only finitely many hyperbolic structures on a surface for which this property holds and I will discuss progress made towards this goal. This is joint work with Christian Millichap and Salman Siddiqi. (Received September 24, 2018)