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Jay Jorgenson* (jjorgenson@mindspring.com), Department of Mathematics, The City College of New York, 138th and Convent Avenue, New York, NY 10031, and **Rolf Lundelius**. *Spectral asymptotics through elliptic degeneration*.

In this work we study spectral theory of the Laplacian on a sequence of hyperbolic Riemann surfaces which have elliptic elements whose order of ramification is unbounded. Following the methodology established in our previous work, we establish an asymptotic expansion for the regularized heat trace in terms of the degeneration parameters. We then derive asymptotic expansions for various spectral functions including wave kernels, resolvent kernels, spectral counting functions, spectral zeta functions, and Selberg zeta functions. As a specific example, we consider the sequence of elliptically degenerating surfaces formed from the Hecke triangle groups, thus quantifying an example first considered by Selberg (see SLN 1001 by Hejhal). (Received February 13, 2006)