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Title: A generalization of Selberg's 3/16 theorem for thin congruence subgroups of $SL_2(\mathbb{Z})$

Abstract: Selbergs 3/16 theorem is about a uniform spectral gap for all congruence subgroups of $SL_2(\mathbb{Z})$. For a given finitely generated subgroup Gamma of $SL_2(\mathbb{Z})$, we establish an analogue of Selbergs 3/16 theorem for congruence subgroups of Gamma, extending the work of Bourgain, Gamburd and Sarnak for the case of big critical exponent. Our formulation is presented in terms of exponential mixing rate for the geodesic flow, which is uniform over all congruence subgroups. This has consequences for uniform resonance free regions for the resolvent of Laplace operators as well as on sieving. Our approach is based on combining expander graph ideas of Bourgain-Gamburd-Sarnak with the Dolgopyat operator approach from hyperbolic dynamics.