On Diophantine approximations by rationals with composite denominators and measure rigidity

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In my talk I will present joint work with M. Einsiedler regarding the following natural question posed by Bourgain: given a number α in $\mathbb{R}$, how well can α be approximated by a rational $\frac{p}{q_1 q_2}$ with $q_1, q_2 < Q$? The trivial bound is $O(Q^{-2})$, we show that this can be improved to $o(Q^{-2})$ for "almost all" Q. The proof uses a new measure classification theorem.