



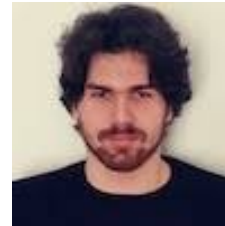
Seminar of the Division of Mathematical Analysis

## Multiple Ergodic Averages Along Primes

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**Abstract:** We discuss convergence (in  $L^2$ ) results for multiple ergodic averages along sequences of polynomial growth evaluated at primes. Building on the work of Frantzikinakis, Host, and Kra who showed that polynomial ergodic averages along primes converge, we generalize their results to other sequences with polynomial growth.

Combining our results with Furstenberg's correspondence principle, we derive several applications in combinatorics. The most interesting application is that positive density subsets of  $\mathbb{N}$  contain arbitrarily long arithmetic progressions with common difference of the form  $\lfloor p^c \rfloor$ , where  $c$  is a positive non-integer and  $p$  is a prime number. The main tools in the proof are a recent result of Matomäki, Shao, Tao, and Teräväinen on the uniformity of the von Mangoldt function in short intervals, a polynomial approximation of our sequences with good equidistribution properties, and a lifting trick that allows us to replace  $\mathbb{Z}$ -actions on a probability space by  $\mathbb{R}$ -actions on an extension of the original system. (Joint work with A. Koutsogiannis)

Tuesday, December 5, 2023, 12:00 - 13:00

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