BOURGAIN'S THEOREM ON ORLICZ SPACES NEAR L^2

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In 2022, Ryou proved a variant of Bourgain's celebrated $\Lambda(p)$ Theorem for Zygmund spaces for $p > 2$. Iosevich and Mayeli stated the $p = 2$ case as an open problem in their 2025 (ACHA) paper and stated that if solved, it would have applications to signal recovery. Limonova made some progress on the latter problem in 2023. In our work, we improve Limonova's result by a logarithmic factor, and we show that the result cannot be improved using the set of probabilistic tools commonly used to solve this type of problem.

Our work is an application of a general framework from Talagrand's textbook (2021). A large component of the talk will be to advocate for the use of frameworks, such as the latter, as a possible problem-solving strategy where our work is a case study.