



The Abdus Salam
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for Theoretical Physics**



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Title: How much does it cost to forget noise structure in low-rank matrix estimation?

Abstract: In this talk, we will delve into the problem of estimating a rank-1 signal that is corrupted by structured rotationally invariant noise. We specifically address the question of how well inference algorithms perform when the statistics of the noise is not known, and therefore, Gaussian noise is assumed. While the matched Bayes-optimal setting with unstructured noise is well understood, the analysis of mismatched problems is relatively limited. Our aim will be to shed some light on the impact of this strong mismatch between the inference model used and the data generating mechanism. Our primary main contributions involve the rigorous analysis of the corresponding Bayes estimator and approximate message passing (AMP) algorithm, both of which mistakenly assume the presence of Gaussian noise. By providing precise asymptotic characterizations for these estimators, we uncover a diverse and surprising phenomenology.