# Kolloquium über Mathematische Statistik und Stochastische Prozesse

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## Optimality of Spectral Clustering in the Gaussian Mixture Model

Spectral clustering is one of the most popular algorithms to group high dimensional data. It is easy to implement and computationally efficient. Despite its popularity and successful applications, its theoretical properties have not been fully understood. We show that spectral clustering is minimax optimal in the Gaussian Mixture Model with isotropic covariance matrix, when the number of clusters is fixed and the signal-to-noise ratio is large enough. Spectral gap conditions are widely assumed in the literature to analyze spectral clustering. On the contrary, we show that these conditions are not needed.

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