

# **The Quantum K-Means Algorithm and the Higgs Boson Decay to Four Leptons**

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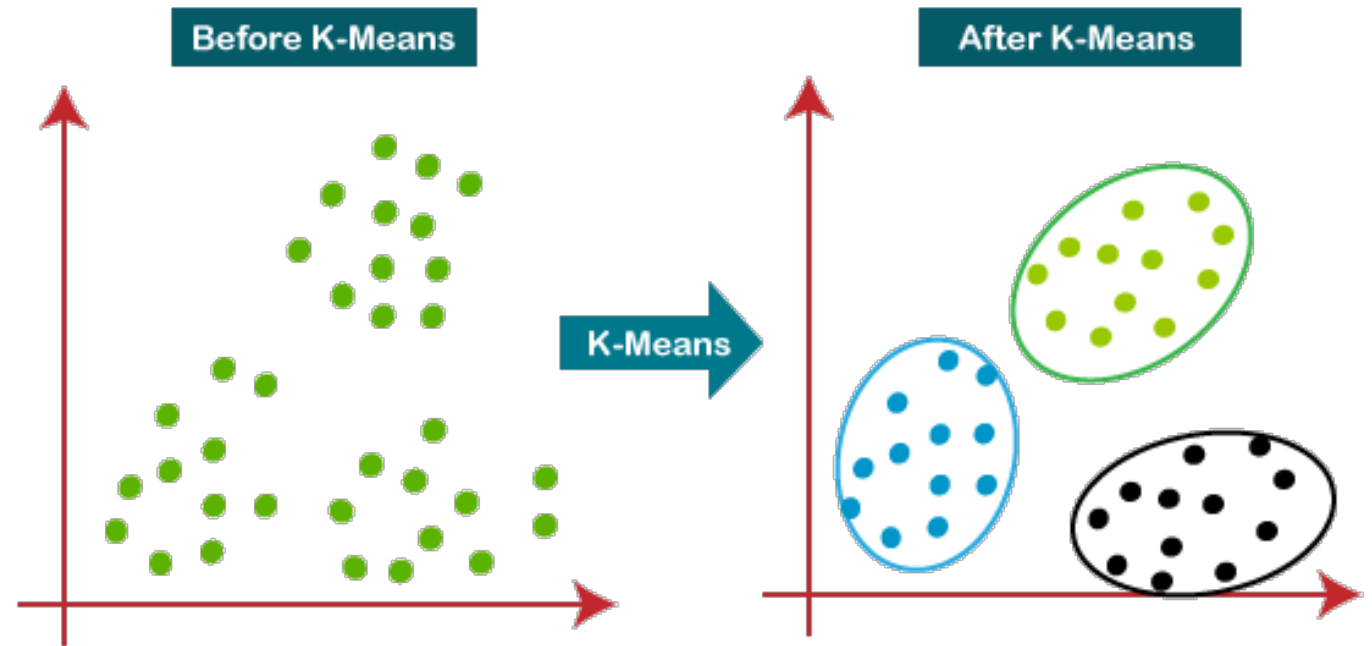
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# Unsupervised Learning and the Higgs Boson

- Sources of Data
- Analysis using classical ML
- Classical Preliminary Results
- Quantum K-Means Algorithm
- QKM Preliminary Results
- Next Steps

# K-Means

- Unsupervised Machine Learning Algorithm
- Classical Version



# Quantum K-Means

- Data Encoding
- SWAPTEST
- Quantum Minimization Algorithm using Grover's Search Algorithm

$$|a\rangle = \frac{1}{|a|} \sum_{i=1}^d a_i |i\rangle$$

