

# Machine learning to predict superconductor critical temperatures

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Raising the superconducting transition temperature to a point where applications are practical is one of the most important challenges in science. However, this has proved to be an extremely complex challenge. Already gaining insights on the  $T_c$  controlling factors have been found an extremely difficult task.

In this thesis work the topic is to analyze the underlining mechanism using machine learning. Recently, machine learning is emerging as a new pillar to understand and predict material properties. One important aspect of machine learning is related to the data representation or fingerprint engineering. In the present work we aim to use a novel machine learning architecture based on graph neural network to address the problem of properly represent superconductors by a machine in order to predict its critical temperature. The work will focus first on standard low temperature superconductors for which the mechanism underlining superconductivity is well known and subsequently address high temperature superconductors.

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**Required skills:** programming, machine learning, material science, physics background.