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Condensed Matter Theory: From Models to First Principles¹
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It can be argued that modern condensed matter theory (CMP) started 100 years ago. Models of materials explained many
solid state phenomena and properties. However, only in the past 50 years—during the “PRL Era”—can it be argued that a
significant number of ab initio calculations for real materials have been done. After some historical comments, the primary
conceptual models will be described. This discussion will be followed by examples of current theoretical work on explaining
and predicting properties and phenomena associated with “real materials.”

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