MOCCA
CMMP Autumn School on
Methods On Computations, Chaos, and Approximations in quantum mechanics and electronic structure theory

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Quantum Chaos – Introduction and Applications

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The concept of how classical chaos shows up in the quantum world, "Quantum Chaos", is discussed. Theoretical tools from random matrix theory and periodic orbit theory are briefly introduced, supported by simple examples from billiard systems and the hydrogen atom in a strong magnetic field. Also complexity in quantum many-body systems are discussed. The role of chaos/regularity on fluctuations of the BCS pairing gap is considered for small systems of particles that are subject to a pairing force. If time allows, we discuss how thermalization is related to quantum chaos in an interacting few-body system.