

Symmetry effects in mesoscopic systems

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We discuss symmetry effects produced by interplay of regular and chaotic dynamics of particles confined by effective potentials of various shapes in finite quantum systems. It is demonstrated that dynamical symmetries emerging from this interplay in classical and quantum systems are related to existence of conserved quantities of the dynamics and integrability. Important role of these symmetries are illustrated on a broad class of mesoscopic systems that include octupole deformed nuclei, two-electron quantum dots in a magnetic field, quantum transport through quantum dots and wires.