

Physics of Scales

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The laws of physics often involve intrinsic scales of physical systems. Whereas scales are typically fixed explicitly in classical physics, scales can be generated dynamically in many-body or relativistic quantum systems. The macroscopic physics at large lengths scales can then be derived from the microscopic degrees of freedom. The Functional Renormalization Group (FRG) provides a unified framework for the physics of scales and relates macroscopic manifestations to microscopic fundamentals. This talk illustrates the physics of scales with several examples from particle physics and many-body physics that can be understood in terms of a flow over a wide range of scales – most prominently formulated by means of the Wetterich equation.