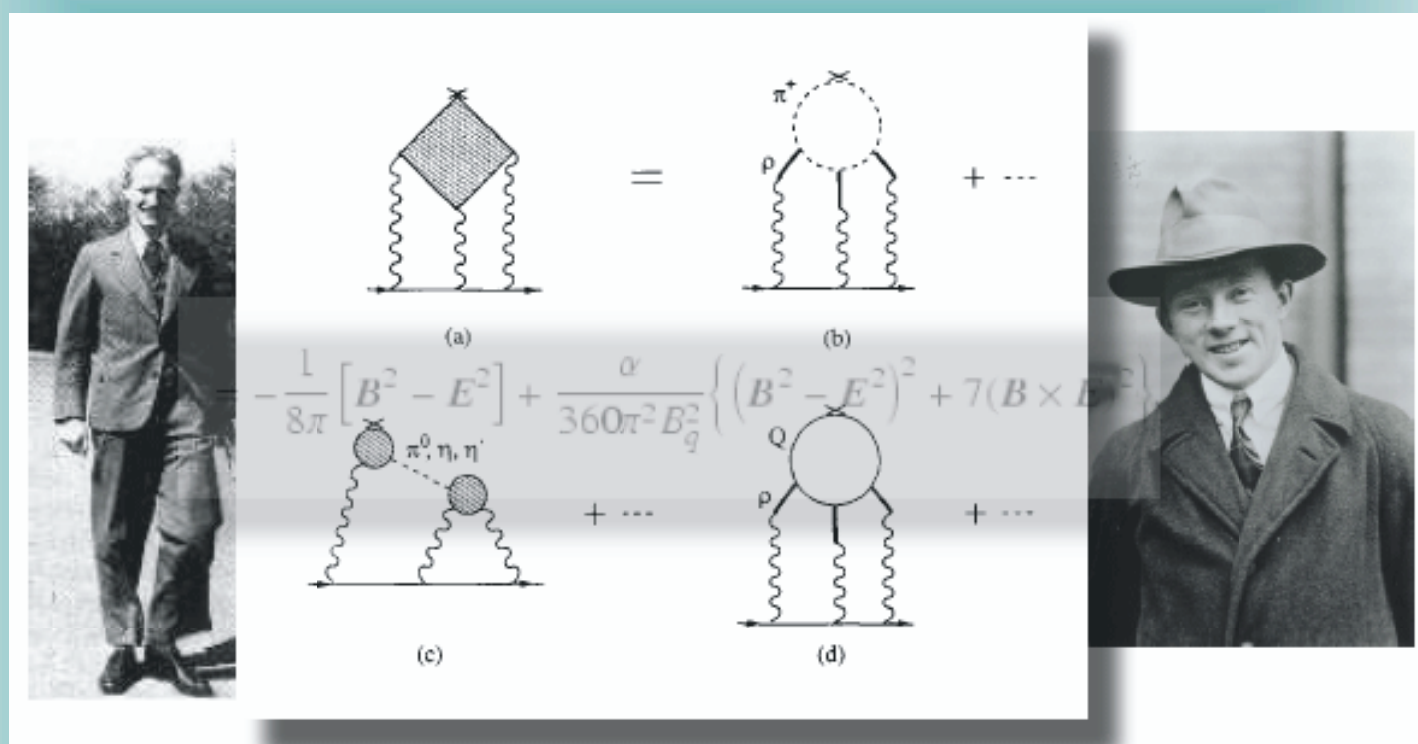




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Effective Theories in Particle Physics

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Abstract

We will begin with a somewhat detailed study of the Effective Field Theory (EFT) for weak interactions at low energies. A rather pedestrian proof of the validity of this EFT in a loop expansion will give valuable insights into the meaning and use of EFTs. This will be demonstrated explicitly in examples.

We turn then to formulating EFTs more generally. Operators will be classified according to their scaling behavior and the concept of renormalizability will be reconsidered, trading it for the concept of naturalness. General considerations of symmetry are presented. Explicit EFTs will be introduced, among them the Standard Model viewed as an EFT, Heavy Quark Effective Theory (HQET), Non-Relativistic Quantum Field Theory (NRQFT) and chiral lagrangians.