

**Ultracold Atoms:
How Quantum Field Theory Invaded Atomic
Physics**

Eric Braaten

Ohio State University

May 6, 2015

4:00 p.m. (coffee @ 3:30)

The development of the technology for trapping atoms and cooling them to ultralow temperatures gave birth to a new subfield of atomic physics. It also led to the introduction of new theoretical methods into atomic physics, in particular quantum field theory (QFT). Methods of QFT developed in high energy physics have proved to be very useful in ultracold atom physics. A unique aspect of ultracold atoms is that their interactions can be tuned experimentally and made arbitrarily large (or small). The simplest QFT's that describe ultracold atoms with large interaction strength are governed by a renormalization group fixed point or a limit cycle. Renormalization has dramatic observable consequences for the momentum distributions of the atoms.

1 West