

PHYSICS COLLOQUIUM

Partially funded by the GSFEI

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“FORMATION AND BOSE-EINSTEIN CONDENSATION OF ULTRACOLD MOLECULES”

TUESDAY, FEBRUARY 17, 2004

4:00 P.M., Rm. A-118, PAA

Reception at 3:45 P.M. in the lobby

SEMINARS
February 17-20, 2004

Abstract: The formation of composite bosons by pairing fermions leads to intriguing phenomena in physics, with superconductivity and ^3He superfluidity being prominent examples. In an ultracold gas of fermionic atoms, the pairing interaction offers exciting possibilities to explore the molecular Bose-Einstein condensation (BEC) in the strong-coupling regime and the Cooper-paired superfluidity in the weak-coupling regime. We report on the Bose-Einstein condensation of more than 10^5 Li_2 molecules in an optical trap starting from a spin mixture of fermionic ^6Li atoms. To form molecules, we employ a broad Feshbach resonance located at a magnetic field of 850G. Below the resonance, where a stable, weakly bound molecular state exists, molecules can be efficiently formed when the thermal energy is lower than the molecular binding energy. Further evaporative cooling by weakening the optical trap leads to the condensation of the molecules. Remarkably, the molecular BEC is collisionally stable and has a long lifetime of >40 s near the Feshbach resonance. The stable molecular BEC allows us to investigate the BEC-BCS crossover. We observe a smooth conversion of the condensate to a degenerate Fermi gas by adiabatically ramping the field across the Feshbach resonance. In the crossover regime, the sample is strongly interacting. The interaction energy and the collective excitation frequencies of the cloud reveal many unexpected features. I will present these findings and compare them to the theoretical predictions in this talk.

Wednesday, February 18, 2004

Condensed Matter Seminar

12:30 P.M., Rm. C-421, PAT

Lincoln Carr, JILA, U Colorado and NIST

“ACHIEVING A BCS TRANSITION IN AN ATOMIC FERMI GAS”

NT Seminar

2:30 P.M., Rm. C-421, PAT

Jamal Jalilian-Marian (INT)

“LATEST FROM RHIC: QUARK MATTER 2004”

Thursday, February 19, 2004

Staffing Colloquium

2:30 P.M., Rm. C-520, PAT

Gilbert Holder (Astrophysics Theory Candidate), Institute for Advanced Study

“The Cosmic Microwave Background at High Resolution”

Astronomy Colloquium

4:00 P.M., Rm. A-102, PAA

Jeremy Darling, Carnegie Observatory

“THE OH MOLECULE AS A PROBE OF GALAXY EVOLUTION AND COSMOLOGY”

Friday, February 20, 2004

Special Particle Theory Seminar

1:00 P.M., Rm. B-042 PAB

Jeremy Darling, Carnegie Observatory

“COSMIC EVOLUTION OF THE FINE STRUCTURE CONSTANT: MICROWAVE MEASUREMENT TECHNIQUES, NEW RESULTS, AND FUTURE PROSPECTS”

Science Forum

3:30 P.M., Rm. A-102, PAA

Wylie Burke, Medical History & Ethics

“SCIENCE AND ETHICS”

<http://www.washington.edu/research/scienceforum/schedule.html>