*University of Washington Department of Physics*

**PHYSICS COLLOQUIUM**, Joint with Mathematics
partially funded by the GSFEI

# seminars

## Elliot Lieb
**Princeton University**

**"The Dilute, Cold Bose Gas: A Truly Quantum-Mechanica Many-Body Problem"**

**Monday, 4/9**
4:00 P.M., Ronald Geballe Auditorium, A-102, PAA
Reception at 3:45 P.M. in the lobby

*April 9-13, 2007*

**Abstract**:
The peculiar quantum-mechanical properties of the ground states of Bose gases that were predicted in the early days of quantum-mechanics have been verified experimentally relatively recently. The mathematical derivation of these properties from Schroedinger's equation has also been difficult, but progress has been made in the last few years (with R. Seiringer, J-P. Solovej and J. Yngvason) and this will be reviewed. For the low density gas with finite range interactions these properties include the leading order term in the ground state energy, the validity of the Gross-Pitaevskii equation in traps (including rapidly rotating traps), Bose-Einstein condensation and superfluidity, and the transition from 3-dimensional behavior to 1-dimensional behavior as the cross-section of the trap decreases. The latter is a highly quantum-mechanical phenomenon.

**Monday, 4/9**

**Public Talk** Stephen Hawking, Cambridge University
7:30 P.M., McCaw Hall, Seattle Center "History of the Universe Backwards"
Tickets may be purchased at Ticketmaster

**Tuesday, 4/10**

**Particle Theory Seminar** Sean Hartnoll, UCSB
2:30 P.M., Rm. C-421, PAT "New Phases of Finite Temperature N=4 SYM Theory"

**Thursday, 4/12**

**Astronomy Colloquium** Scott Gaudi, Ohio State University
4:00 P.M., Rm. A-102, PAA "Taking the Inventory of ExtraSolar Planets with Microlensing"

**Chalkboard Club Seminar** Joaquín E. Drut
5:00 P.M., Rm. C-520, PAT "Universal Fermi Gases"

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