Doctor Peter Milonni will visit the Institute for Optical Sciences from October 15 to 19, 2007 as part of the Institute’s Distinguished Visiting Scientists program.

Doctor Peter Milonni received his Ph.D. from the University of Rochester in 1974 and is currently a Laboratory Fellow and Laboratory Associate at the Los Alamos National Laboratory. His research interests in theoretical physics include quantum optics and electrodynamics. He has served on various advisory and editorial boards and as a consultant for private corporations, and his publications include the books Lasers (with J. H. Eberly), The Quantum Vacuum, and Fast Light, Slow Light, and Left-Handed Light.

Dr. Milonni will give 3 lectures during his visit, described below:

**Quantum Fluctuations of the Electromagnetic Field**

All lectures will take place in the Davenport Room, 3rd floor of the Lash Miller building, 80 St. George Street.

**Lecture 1: Zero-Point Energy**
Monday, October 15 at 2 p.m.

The development of the concept of zero-point energy in quantum theory will be reviewed. Attention will then be focused on current ideas about zero-point electromagnetic energy and its role in explaining various important phenomena such as spontaneous emission, the Lamb shift, and quantum noise in lasers and optical amplifiers.

**Lecture 2: The Casimir Effect, Part One**
Tuesday, October 16 at 11 a.m.

One of the most frequently cited examples of the “reality” of zero-point energy is the Casimir effect, predicted by Hendrik Casimir in 1948. This is the force of attraction between parallel, uncharged conducting plates in vacuum, attributable to the change in zero-point (vacuum) electromagnetic radiation due to the presence of the plates. Classical electromagnetic theory predicts no force between the plates, whereas recent experiments have left no doubt that the Casimir force does in fact exist. The Casimir effect, as well as the Casimir-Polder effect for an atom near a conducting plate, will be derived in the conventional way and the experiments will be briefly described.

**Lecture 3: The Casimir Effect, Part Two**
Friday, October 19 at 2 p.m.

The Casimir and Casimir-Polder effects will be related to the intermolecular van der Waals interaction, and on this basis will be derived in very simple, albeit approximate ways. Alternative explanations of these effects, based on the “fluctuation-dissipation theorem,” will be given. The implications of the Casimir effect for our understanding of the vacuum in quantum theory will be discussed.

The IOS Distinguished Visiting Scientists series is organized with financial support from the Ontario Centres of Excellence.

For more information on the lectures and on Dr. Milonni’s visit please contact Emanuel Istrate.