

2008 Walter Boas Medal in Physics awarded to Professor Peter Drummond

The AIP Boas Medal Selection Panel 2007 has unanimously recommended the award of the 2008 Walter Boas medal to Professor Peter Drummond, Australian Research Council Centre of Excellence for Quantum-Atom Optics, and Centre for Atom Optics and Ultrafast Spectroscopy, Swinburne University of Technology.

The Walter Boas award is made by the Australian Institute of Physics for original research making, in the opinion of the examiners, the most important contribution to physics. This is judged in papers published during the four years immediately preceding the date on which entries for the award close.

Professor Drummond's research dealing with many-body problems, particularly in relation to ultra-cold atoms and in quantum optics, has led to the development of new theoretical calculations in both fields. This theoretical work has been characterised by testable predictions and consequently Professor Drummond's work has been adopted by a range of experimental groups.

In papers published in the 4 years preceding the date on which entries for the award close Professor Drummond has produced an exceptional body of work including:

- development of evidence for universality in strongly interacting Fermi gases, where the state of the system can be described by a single parameter;
- development of methods of treating the stochastic equations in quantum many-body calculations, including by use of Gaussian representations, which has attracted widespread attention as a possible route towards explaining high-T_c superconductivity;
- application of the phase-space methods of dealing with many-body systems towards quantum dynamical problems, which are the only known first principles methods for calculating the time-evolution of many-body quantum systems in any number of dimensions; and
- discoveries in fundamental quantum theory leading to the first continuous variable Bell inequality for correlations, giving the possibility of high efficiency, loophole-free demonstrations of the failure of local realism in quantum mechanics.

The importance of Professor Drummond's work is evidenced by exceptional citation rates, even within the relevant field of research, indicating a high degree of visibility for the theoretical work. In addition the high level of adoption by experimentalists of the published results as well as use of the developed theoretical results to explain existing experimental results indicates a significant impact of the work on the community. Finally, this assessment has been endorsed by the selection of Professor Drummond's papers for editors' awards and collections.