

INSTITUTE FOR RADIOPHYSICS AND SPACE RESEARCH

SEMINAR INVITATION:

Date: Wednesday 27 May **Time:** 3.00 pm

Venue: WT 126, corner of Rutland and Wakefield Streets.

Presenter: Jordan Alexander, PhD Student

Topic:

Addressing a decade-old cosmic mystery: observation and analysis of radio recombination lines in spectra of galactic nebulae.

Abstract:

Utilizing telescopes in NZ, Australia and North America, we propose to evaluate a novel software frequency-switching technique for measuring extremely weak spectral-lines, e.g. radio lines of molecules, high-order RRLs of hydrogen, helium and carbon, etc. As a test of this technique, we propose to put to rest a decade-old mystery initiated by the observation of the highest transition-order lines of hydrogen ever published (Bell et al. 2000). Specifically, we will test, for the first time, puzzling findings that suggest HI line-widths decrease, while line-areas increase above predicted values for $n > 180$, $\Delta n > 6$ by observing RRLs in the Orion nebula and NGC 3603 at 6GHz.

It is expected that these observations, together with NZ-based supercomputer-simulations of nebulae, will lead to a deeper understanding of the quantum nature of matter, particularly at low densities and high principal quantum numbers.