

Anderson Localization of Ultrasonic Waves in Three-dimensions

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DATE: Friday, November 13, 2015

TIME: 3:00 PM

PLACE: C2045

ABSTRACT: More than fifty-five years after Anderson localization was first proposed, there is currently a resurgence of interest in this phenomenon, which has remained one of the most challenging and fascinating aspects of wave transport in random media. Localization may be viewed as the ultimate trapping of waves by disorder, and is especially interesting in three dimensions (3D), as it is only in 3D that scaling theory predicts the existence of a real transition from propagating to localized waves. However, despite intense efforts over the years, experimental evidence for the 3D localization of classical waves (light or sound) has remained elusive and controversial until quite recently. In this talk, I will summarize our progress in demonstrating the localization of ultrasound in a “mesoglass” made by assembling aluminum beads into a three-dimensional elastic network. I will review how we establish unambiguously that localization does indeed occur in our mesoglass samples, and how this enables us to study aspects of 3D classical wave localization that have not previously been amenable to experimental investigation.

Dr. John Page is the recipient of the 2015 Brillouin Medal awarded by the International Phononics Society in recognition of his seminal work on focusing of acoustic waves by negative refraction, and the 2015 recipient of the Canadian Association of Physicists’ Brockhouse medal, which recognizes outstanding contributions by Canadians to condensed matter and materials physics. He will be delivering the Faculty of Science’s 2015 Elizabeth R. Laird Lecture. This public lecture, titled *The Magic of Waves in Complex Media: Using Ultrasonic Spectroscopies to Explore Remarkable Wave Phenomena and Materials*, will take place Thursday, Nov. 12, at 7 p.m. in A-1043 with a reception to follow.

We are pleased to have Dr. John Page visiting our department Thursday and Friday this week. Please contact James Munroe (jmunroe@mun.ca) if you like to schedule time to meet with Dr. Page personally or with a small group.

All are welcome to both the departmental seminar and the public lecture!