Welcome to the monthly IOS Newsletter. We hope that this will serve to keep you informed about the events and developments in the IOS community.

**Academic/Research**

**Relativistic electron mirrors from nanoscale foils for coherent frequency upshift to the extreme UV**

Associate Professor in the Department of Physics and IOS faculty member Prof. Robin Marjoribanks was part of an international collaboration that recently reported in *Nature Communications* on their efforts to produce X-rays from light reflected off mirrors moving near the speed of light. The group, which included researchers from Germany, the UK, the US, and Canada, demonstrated for the first time that dense relativistic electron mirrors can be created from the interaction of a high-intensity laser pulse with a freestanding, nanometre-scale thin foil. The experiment showed that the frequency of a counter-propagating laser pulse was coherently shifted from the infrared to the extreme UV with a very high efficiency. Read the full paper [here](#).

**Single electron induces double reaction by charge delocalization**

IOS faculty member Prof. John Polanyi has recently published an article in the *Journal of the American Chemical Society* (JACS) showing that in compounds with highly delocalized charges, a single electron can preferentially induce multi-site reactions. The experiment was performed using ortho-diiodobenzene physisorbed on a Cu(110) surface. When a single electron was injected into the molecule using a scanning tunneling microscope, both carbon-iodine bonds reacted, whereas similar previous work with para-dihalobeneze induced a reaction in only a single carbon-halogen bond. The authors attributed this effect to an overlapping of the iodine antibonding orbitals, leading to increased charge delocalization. The full article is available on the JACS [website](#).

**Entrepreneurship**

**IOS at OCE Discovery**
On May 27 and 28, the Ontario Centres of Excellence hosted their annual Discovery conference at the Metro Toronto Convention Centre in Toronto. Drawing companies and delegates from across the province, the two day conference featured a number of competitions, talks, and a large exhibitor hall where a number of the IOS companies were able to showcase their innovative products and ideas. Also, four IOS companies, Lunanos, Chematria, Sonola Imaging, and Pathcore, were chosen to be among the ten companies to present in the Experiential Learning Program (ELP) competition finals.

**Lumentra approved as Energy Star testing site**

Introduced by US Department of Energy and Environmental Protection Agency (EPA), the ENERGY STAR program is an international indicator for energy efficient products. The EPA requires that all ENERGY STAR products must be certified by a third-party to ensure consumer confidence, and Lumentra was recently approved to provide these testing services. “To qualify for Energy Star certification, LED lighting products must pass a variety of tests to prove that they meet strict efficiency, quality, and lifetime criteria. Our team will help local and international lighting industry with their product certification needs” said Dr. Venkat Venkataramanan, Chief Technology Officer of Lumentra.

**Events**

**Bringing innovators and industry together**

On June 11, 2013, the IOS is hosting an event in partnership with Sustainable Development Technology Canada (SDTC) to help bring researchers from the University of Toronto together with industry to align new technologies with business needs and learn about SDTC’s Virtual Incubator. Speakers for the event include John Adams (Director, Applications, SDTC), Richard McAloney (Director, Technology Management, IOS, University of Toronto), Bradley Smith (Vice-President Regional Programs, GE), and Flavio Campagnaro (Chief Manufacturing Officer, Vive Crop Protection).

*Where:* TechnoLABS, Best Institute, 112 College St., Room 417  
*When:* June 11, 2013, 9:00 am to 1:30 pm  
*Registration is free and available online.*