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# Rectifying Garbage-in Equals Garbage-Out Using a Secondary Electron Yield Materials Database

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# Physics Colloquium

## Rectifying Garbage-in Equals Garbage-Out Using a Secondary Electron Yield Materials Database

**Phillip Lundgreen**
Blood Scholar
Mentor: Dr. JR Dennison

Secondary Electron Yield (SEY) is a critical material property that has had many different values reported for specific elements and compounds. SEY gauges the number of emitted electrons per incident electron and is a basic material property that is of critical importance for many physics-based applications. A study has been conducted on copper to identify the relative importance and origins of variations of SEY vs. incident energy curves. Variations may result from or be attributed to: bulk composition and impurities, surface modification, sample modification, sample charging; instrumentation effects, and absolute calibrations techniques. Agreement between the various curves for copper found in the literature, is underwhelming, with a variation of ~60% observed. These results support the need to develop a detailed database of electron yield curves that include pertinent materials and background information for each study.

## Seasonal and Solar Flux Dependence of the Equatorial Ionospheric Disturbance Dynamo Electric Fields

**Luis Navarro**
Blood Scholar
Mentor: Dr. Bela Fejer

Ionospheric electrodynamics plays a dominant role in the low latitude plasma density distribution and generation of plasma waves and irregularities, which affect low latitude communications, navigation and positioning systems. Equatorial disturbance dynamo electrodynamic (ExB) plasma drifts are driven by enhanced energy deposition into the high latitude ionosphere during geomagnetic storms. These disturbance electric fields undergo large and long-lasting changes during and after geomagnetic storms. We used extensive observations from the incoherent scatter radar at the Jicamarca Radio Observatory, near Lima, Peru from 1968 to 2018 to significantly extend the current understanding of equatorial disturbance dynamo (zonal electric fields) vertical plasma drifts. We show that these drifts strongly increase from solar minimum to solar maximum, have strong seasonal dependence, and pronounced equinoctial asymmetry particularly near sunset.

**Tuesday, November 6, 2018**
**3:00 pm**
CASS/PHYSICS CONFERENCE ROOM
**SER 244**