



Contribution ID: 1179 Contribution code: THPA185

Type: **Poster Presentation**

## Effect of oxygen and other impurities on copper coating conductivity at cryogenic temperatures

*Thursday, 11 May 2023 16:30 (2 hours)*

Theoretically copper resistivity to a good approximation may be viewed as the sum of a term phonon-electron scattering term, and a constant term. The first follows the Bloch-Gruneisen formula; goes to zero as  $T^5$  at low temperature. The constant term corresponds to scattering off defects and magnetoresistance. The defect part is due to impurities and finite crystal size. Since copper coating maybe backup to sleeve insertion in RHIC, the constant term should be kept sufficiently small. Coatings of 10  $\mu\text{m}$  thick copper films were deposited on RHIC pipes; their RF conductivity measured. One deposition had RRR of 1.2, while another deposition resulted in RRR of 2.3. Multiple measurements reveal that the only difference between these copper depositions was in the miniscule quantity of oxygen contamination 0.125% versus 0.03% respectively; consistent with predictions for O; but puzzling results for other impurities. Measurement results will be presented.

### Funding Agency

Work supported by Brookhaven Science Associates, LLC under Contract No. DE-SC0012704 with the U.S. Department of Energy

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** HERSHCOVITCH, Ady (Brookhaven National Laboratory)

**Co-authors:** BLASKIEWICZ, Michael (Brookhaven National Laboratory); BOSCOBOINIK, Anibal (Brookhaven National Laboratory); BRENNAN, Joseph (Brookhaven National Laboratory); CAMINO, Fernando (Brookhaven National Laboratory); CUSTER, Art (Poole Ventura, Inc.); ERICKSON, Mark (Poole Ventura, Inc.); FISCHER, Wolfram (Brookhaven National Laboratory); KISSLINGER, Kim (Brookhaven National Laboratory); POOLE, Henry (Poole Ventura, Inc.); VERDU-ANDRES, Silvia (Brookhaven National Laboratory (BNL))

**Presenter:** HERSHCOVITCH, Ady (Brookhaven National Laboratory)

**Session Classification:** Thursday Poster Session

**Track Classification:** MC7: Accelerator Technology and Sustainability; MC7.T31: Subsystems, Technology and Components, Other