



Contribution ID: 219

Type: Oral

## DC-DC Converters Using New Materials and Architectures

*Thursday, 9 November 2023 14:20 (15 minutes)*

Future detector systems will require miniaturized, low mass, low electromagnetic interference (EMI), magnetic field tolerant, and radiation tolerant power converters. One approach is to use on-chip or on-module DC-DC converters. These converters typically use inductors as an energy storage element, which can be physically large compared to the electronics they power, and require EMI and magnetic shielding. Inductors can be difficult to miniaturize and integrate on-chip while maintaining high efficiencies. Switched capacitor (SC) offer an alternative for on-chip DC-DC converters, but can suffer from low efficiencies because of bottom-plate leakages, and generally have fixed voltage conversion ratios. Piezoelectric resonators (PRs) show promise for a new class of resonant DC-DC converters. PRs have been demonstrated to work in buck and boost configurations for a large range of power output. PRs can be miniaturized while maintaining high quality (Q) factors and thus realize high efficiencies, and are low EMI. We present work at the University of Pennsylvania on PR converters, and propose investigation into opportunities in PR converters and alternative inductor-less converter designs.

### Early Career

No

**Primary author:** Mr NIKOLICA, Adrian (University of Pennsylvania)

**Presenter:** Mr NIKOLICA, Adrian (University of Pennsylvania)

**Session Classification:** RDC4

**Track Classification:** RDC Parallel Sessions: RDC4: Readout and ASICs