**Introduction**

- Power and energy have become a first-class design constraint in all areas of computing.
- Data movement thought to be a major source of power consumption.

**Objective**

Measure and understand the nature of data-movement power on real hardware.

**Related Work**

Energy cost of moving data from L2 to L1 = $E_{L2} - E_{L1}$

**Limitation**

- L2 access power cannot be isolated

**Our Approach**

Design microbenchmarks based on data-movement distance as wire distance affects power.

**Challenges and Solutions**

- OpenCL™ lacks native support to pin threads to programmer-specified compute units.
- Temperature of device during tests will affect the power consumption.

**Summary of Results**

- Linear relationship between (i) distance and power
- (ii) toggle rate and power
- Asymmetrical power consumption for 0s and 1s
- Up to 14% of dynamic power spent in data movement

**Optimization(s)**

- On-chip data movement power reduces by 48% for an L1-L2 distance optimized layout
- More results in the paper.