1134-18-27 **Brendan Fong*** (bfo@mit.edu). *Black boxes and decorated corelations.*

Consider an electric circuit. Suppose this circuit has chosen terminals, which we may connect with the terminals of another circuit. That is to say, consider that we may compose two circuits to obtain another circuit. This suggests we might model circuits as morphisms in a category.

Next, suppose I want to compose a circuit with a resistor of resistance 2 ohms. If I have no such resistors, I could substitute with a pair of 1 ohm resistors in series. This suggests a coarser representation of circuits, one that keeps track of only how the circuit *behaves*, and not their constituent components.

In this talk I shall introduce decorated corelations as a tool for constructing categories that model circuits, and constructing 'black box' functors that shift between these models. This framework is applicable not only to circuits, but to open systems in general. (Received June 23, 2017)