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**Positive operator valued measurements from destructive weak measurements** TODD BRUN, YI-HSIANG CHEN, Univ of Southern California — Earlier work has shown that any generalized measurement can be performed in principle by a sequence of weak measurements. For certain well-defined families of weak measurements, the families of achievable generalized measurements have also been determined. But this earlier work does not include an important experimental case, where the only available measurements are *destructive*. For example, most practical methods of measuring states of light require the absorption of the light and hence the destruction of the measured system. Such destructive measurements are best described by *positive operator valued measurements* (POVMs). In the current work, we make a first approach to this problem using a simple qubit model, where the only measurements allowed are on the output of an amplitude damping channel. Surprisingly, for this model it is possible to perform any two-outcome POVM on the measured system by a sequence of such lossy weak measurements. We discuss how this approach may be generalized to more complicated systems and what limitations may apply.

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