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SZ Cluster Surveys and Cosmology

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Recent millimeter-wave surveys from instruments such as the Atacama Cosmology Telescope (ACT), the South Pole Telescope (SPT), and the Planck satellite have been able to blindly detect galaxy clusters through the Sunyaev-Zel'dovich (SZ) effect. The SZ effect is a powerful technique for detecting galaxy clusters as it is independent of cluster distance. In turn, the number of galaxy clusters that exist over cosmic time is a powerful probe of cosmology and fundamental physics. I will discuss constraints on cosmology using SZ clusters detected with ACT. I will also review a newly detected secondary SZ effect, called the kinetic SZ effect, and its potential use for cosmology. The challenges that arise when using these techniques will also be discussed, as well as ways forward.