

Abstract Submitted  
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**A multiwavelength approach to constraining the Merger Properties of ACT-CL J0034.4+0225**<sup>1</sup> PETER DOZE, JOHN HUGHES, CHARLES KEETON, Rutgers, The State University of New Jersey, MATT HILTON, University of KwaZulu-Natal, CATIE RANEY, Rutgers, The State University of New Jersey, ATACAMA COSMOLOGY TELESCOPE COLLABORATION — ACT-CL J0034.4+0225 is a massive galaxy cluster in an intriguing dynamical state, that is detected at high significance by the Atacama Cosmology Telescope (ACT). We obtain multiwavelength data from *Chandra*, SALT, *DES*, and *Hubble*. Several mass proxies from the *Chandra* data yield a total mass within the range  $M_{500} = 5 - 8 \times 10^{14} M_{\odot}$ , which is generally consistent with the literature. The X-ray image shows two clear surface brightness peaks, each associated with a bright cluster galaxy (BCG). We determine the projected distance between the peaks and the velocity difference between the BCGs. These measurements are constraints for comparing ACT-CL J0034.4+0225 with N-body/hydrodynamic galaxy cluster merger simulations. The constraints restrict the suite of simulations to those within 1.4 Gyr of first pericenter, while the mass ratio and merger impact parameter remain largely unconstrained. We additionally perform a strong lensing analysis with the *Hubble* data and simulations, leading to a favored mass ratio of 3:1 also near pericenter. Deeper *Chandra* observations, multicolor HST observations, and new simulations would produce better constraints on the properties of this interesting merger.

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