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Measuring the kinematic Sunyaev-Zel\'dovich effect with the South Pole

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Inferences of the peculiar velocities of galaxy clusters can potentially constrain cosmological models and probe gravity on large length scales. Such inferences are becoming a reality with detections of the kinematic Sunyaev-Zel'dovich (kSZ) effect. The kSZ effect arises when cosmic microwave background (CMB) photons scatter off free electrons in dense clusters of galaxies that are moving with respect to the CMB; the bulk motion of clusters Doppler shifts the CMB signal. With future data sets, the kSZ signal could provide precise measurements of gravity on ˜100 MPc scales. This talk will present a significant (˜4 sigma) detection of the pairwise kSZ signal using a cluster catalog from the first year of data from the Dark Energy Telescope (DES) in combination with CMB temperature maps from the South Pole Telescope. This represents the first detection of the kSZ effect from a cluster catalog with photometric redshifts and one of the first results from the DES year-one data.