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Cosmology with the Planck all-sky Compton parameter map

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Clusters of galaxies are the largest bound structures in the Universe. Thus, they are observables of choice for cosmology both in terms of their aboundance and of their distribution on the sky. Clusters of galaxies can be observed at different wavelengths via their X-ray and radio emission as well as from the optical emission of their galaxies. In addition, they can be studied via the thermal Sunyaev-Zeldovich (tSZ) effect, which is the distortion of the CMB spectrum caused by the interaction of the CMB photons with the diffuse hot gas in the clusters.
The Planck satellite, observing the sky at 9 frequencies from 30 to 857 GHz with a resoltuion from 40 to 4.5 arcmin, is particularly well adapted to the study of the tSZ effects in clusters of galaxies. Using dedicated component separation methods and by combining the Planck data at all frequencies we have obtained the first all-sky map Compton parameter map of the tSZ emission. We present here a detailed characterisation of this map in terms of noise properties and systematics. We also present the angular power spectrum and non-gaussian properties of the map. Finally, these are used to obtain constraints on cosmological parameters. We find good agreement with the results obtained from cluster number counts and in weak tension with CMB ones. We briefly indicate how the latter can be understood in terms of cluster physics.

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