Recent results and perspectives on cosmology and fundamental physics from microwave surveys - DTU Orbit (09/11/2017)

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Recent cosmic microwave background (CMB) data in temperature and polarization have reached high precision in estimating all the parameters that describe the current so-called standard cosmological model. Recent results about the integrated Sachs-Wolfe (ISW) effect from CMB anisotropies, galaxy surveys, and their cross-correlations are presented. Looking at fine signatures in the CMB, such as the lack of power at low multipoles, the primordial power spectrum (PPS) and the bounds on non-Gaussianities, complemented by galaxy surveys, we discuss inflationary physics and the generation of primordial perturbations in the early universe. Three important topics in particle physics, the bounds on neutrinos masses and parameters, on thermal axion mass and on the neutron lifetime derived from cosmological data are reviewed, with attention to the comparison with laboratory experiment results. Recent results from cosmic polarization rotation (CPR) analyses aimed at testing the Einstein equivalence principle (EEP) are presented. Finally, we discuss the perspectives of next radio facilities for the improvement of the analysis of future CMB spectral distortion experiments.

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