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CMB lensing and deflection angles in high precision cosmology

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We present a new method to compute the deflection of light rays in a perturbed FLRW geometry. By using the properties of the Geodesic Light Cone (GLC) gauge where null rays propagate at constant angular coordinates irrespectively of the given (inhomogeneous and/or anisotropic) geometry, the gravitational deflection of null geodesics can then be obtained in any other gauge. This connection can be done by expressing the angular coordinates of the given gauge in terms of the GLC angular coordinates. We apply this method to the standard Poisson gauge, including scalar perturbations, and give the full result for the deflection effect in terms of the direction of observation and observed redshift up to second order, and up to third order for the leading lensing terms. Furthermore, we also discuss the connection with literature and estimate the effects of lensing on the CMB temperature.

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