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# Faraday Rotation Measure due to the Intergalactic Magnetic Field II: the Cosmological Contribution

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We investigate the Faraday rotation measure (RM) due to the intergalactic magnetic field (IGMF) through the cosmic web up to cosmological distances, using a model IGMF based on turbulence dynamo in the large-scale structure of the universe. By stacking the IGMF and gas density data up to redshift $z=5$ and taking account of the redshift distribution of polarized background radio sources against which the RM is measured, we simulate the sky map of the RM. The contribution from galaxy clusters is subtracted from the map, based on several different criteria of X-ray brightness and temperature. Our findings are as follows. The distribution of RM for radio sources of different redshifts shows that the root-mean-square (rms) value increases with redshift and saturates for $z \ga 1$. The saturated value is RM$_{\rm rms} \approx$ several ${\rm rad m^{-2}}$. The probability distribution function of $|{\rm RM}|$ follows the lognormal distribution. The power spectrum has a broad plateau over the angular scale of $\sim 1 - 0.1^\circ$ with a peak around $\sim 0.15^\circ$. The second-order structure function has a flat profile in the angular separation of $\ga 0.2^\circ$. Our results could provide useful insights for surveys to explore the IGMF with the Square Kilometer Array (SKA) and upcoming SKA pathfinders.

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*Which authors of this paper are endorsers?*