

Z116b VERTECS: Study for Observation of Extragalactic Background Light Fluctuation

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The Extragalactic Background Light (EBL) is important for understanding the history of star formation. Previous studies have shown the presence of excess light in the near-infrared EBL surface brightness and fluctuation, which cannot be explained by known galaxies. First stars and Intra-halo objects are candidates for excess light, and the spectral energy distribution is predicted to show clear difference in the optical wavelength. To clarify the origin, it is important to observe the surface brightness and fluctuations of the visible EBL. Measuring small spatial fluctuations in EBL requires longer exposure time than observing surface brightness.

Purpose of the present study is to verify whether fluctuation can be detected by the 6U nano-satellite VERTECS (Visible Extragalactic background RadiaTion Exploration by CubeSat) and to establish an observation plan. We study the following three points. First, we assess fluctuation of foreground emissions (zodiacal light, integrated starlight and diffuse Galactic light) by using simulation images created for VERTECS observation. Next, we construct fluctuation models of a candidate for excess light. Finally, we estimate the number of observations needed to detect visible EBL fluctuations. Our study suggests that detecting visible EBL fluctuations is possible by observing the same sky region more than 100 times with 60-second exposures.