

High-speed stereoscopy of aurora

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We performed 100 fps stereoscopic imaging of aurora for the first time. Two identical sCMOS cameras equipped with narrow field-of-view lens (15 deg by 15 deg) were directed at magnetic zenith with the north-south base distance of 8 km. Here we show the best example that rapidly pulsating diffuse patch and streaming discrete arc were observed at the same time with different parallaxes, and the emission altitudes were estimated as 85-95 km and >100 km, respectively. The estimated emission altitudes are consistent with previous studies, and it is suggested that high-speed stereoscopy is useful to directly measure the emission altitudes of various types of rapidly varying aurora. It is also found that the time variation of emission altitude is gradual (e.g., 10 km increase over 5 s) for pulsating patches and fast (20 km increase within 1 s) for streaming arcs.