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Modeling Research on Atmospheric Optical Turbulence

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Abstract

The monitoring of optical turbulence profile and the corresponding integrated parameters are necessary for optical observations, telescope design and operation of modern large telescope.Besides practical measurements, an atmospheric optical turbulence modeling method has been gradually developed among the international astronomical community. The method utilizes mesoscale meteorological model to obtain meteorologic parameters, which will be further transferred to optical turbulence parameters according to the parametrization model of optical turbulence. The optical turbulence calculating experiment has been carried out using WRF model at Ali Observatory which locates in Tibetan Plateau, and the characteristics of the meteorological parameters, the $C_n{}^2$ profiles and seeing are obtained, which are significant for astronomical site testing. The modeling research of atmospheric optical turbulence is now widely used, and the reliability has also been verified by measurements statistically. There are still some improvements needed for the modeling method, and also at a new site, the model should be modified to fit the local environment.