

## WHEAT LEAF AREA INDEX EXTRACTION COMBINING PASSIVE OPTICAL WITH ACTIVE LASER GROUND SPECTRUM OBSERVATION

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**KEY WORDS:** Leaf Area Index (LAI), wheat, laser, reflectance

**Abstract:** This research aims to retrieve wheat LAI using two types of light intensity, solar and laser, based on the ground observation data. When the wheat was illuminated by laser in the daytime, usually the received spectrum was from both solar multi-angle reflection and the laser hotspot information. Theoretically, the observation of double light source could improve the extraction of vegetation biophysical parameters (eg. LAI). So, the ground experiment was carried out in china for the widely planted wheat to valid it. In the daytime, both sun separately and sun-laser double source illuminated were studied. In the dark night, laser hotspot observation was separately conducted. Based on the experiment, it was found that the classical canopy reflectance model was applicable for the double source observation while considering the intensity change in the course. So the Radiative Transfer (RT) model was used for the LAI extraction in this conditon. Based on the hotspot reflectance supplied by laser, the integrated method was put forward to extract LAI of wheat. The new method divided the received intensity into sun and laser view intensity respectively. Then, the passive optical single angle reflectance and laser hotspot information was utilized to extract the LAI based on the RT model. It was found that, the synthetic method could easily offer the hotspot observation which was important for the vegetation parameter retrieval. And the combination could improve the extraction capacity of wheat LAI.