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PRIMARY INVESTIGATION OF THE AM0 SOLAR CELL SPACE CALIBRATION

Abstract

The AM0Air Mass Zerosolar cell calibration techniques have been attracting much attention of the main aerospace organizations of the world for many years. In China solar cells are usually calibrated by the ground-based solar simulators. However, with the development of a variety of new solar cells for spacecraft, such as the thin film solar cells and the GaAs multi-junction cells, the calibration and test systems of which are much more complicated than the single-junction silicon cells', and the ground-based calibration technique has met lots of difficulties, not only in theory but in practice. So that calibration in space, which is in the actual working state of the solar cells, becomes the best way to evaluate their performance. Early form the 50's of the 20th century, the United States have been doing AM0 solar cell calibration experiments with high-altitude airplanes, high-altitude balloons, sounding rockets, satellites and space shuttles, and have accumulated a lot of meaningful data. The ESA (European Space Agency) proposed and carried out the satellite solar calibration experiment plan, and from then on, a number of experiments have been carried out on board. As the new members of the space technology club, Japan and Brazil have carried out their own space solar cell calibration experiments. China hasn't done any space calibration experiments of solar cells by present. The development of new space solar cells has been greatly affected, since it's difficult to evaluate their performance. Beijing Orient Institute of Measurement has taken action of development of Am0 Solar Cell Space Calibration Prototype. The Prototype is made up of the solar cell panel, the data acquisition module, the solar incident angle detector and the temperature measurement module. There are 32 domestic multi-junction GaAs solar cells on the solar cell panel, and each is 2cm*2cm. The data acquisition module is able to measure the short-circuit current of all the solar cells at the same time, with the standard uncertainty less than 0.5