

AM0 Standard Spectrum Solar Simulator: SS-ZXR

Introduction

With the development of space science and technology, the simulation of sunlight in outer space has formed a crucial issue for further developments of space exploring. The AM0 standard spectrum is defined according to the ASTM standard, which has the following characteristics:

1. Compliant with ASTM AM0 standard spectrum (ASTM E927 – 10)
2. Irradiance intensity up to 1366W/m²
3. Light spatial non-uniformity is smaller than 2%



To provide the AM0 solar simulation, Enlitech utilized the Xenon short arc lamp technology as a broadband light source to simulate AM0 solar light. The color temperature of xenon lamps is 6000K, which is closest to natural sunlight (5500K). The SS-ZXR solar simulator not only uses advanced optical simulation software to simulate the design of the optomechanical system, but also uses Fourier optics technology to generate spatially uniform irradiance.

SS-ZXR solar simulator, its AM0 filter is made with advanced plasma deposition technology, which has higher spectral match and longer lifetime. Better spectral match makes SS-ZXR more suitable than any other simulators for characterizing solar cells for space applications.

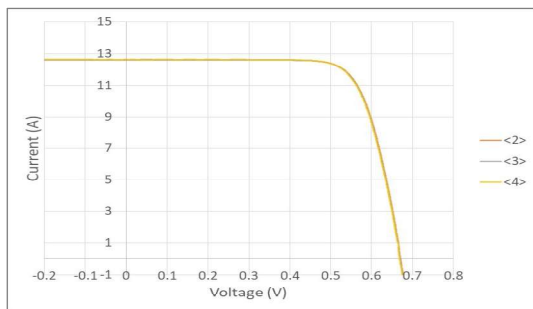
Application

- ◆ Silicon solar cell testing for space application
- ◆ Organic solar cell testing for space application
- ◆ Perovskite solar cell testing for space application
- ◆ CPV (Concentrated Photovoltaic) testing
- ◆ Solar cell aging experiments for space application

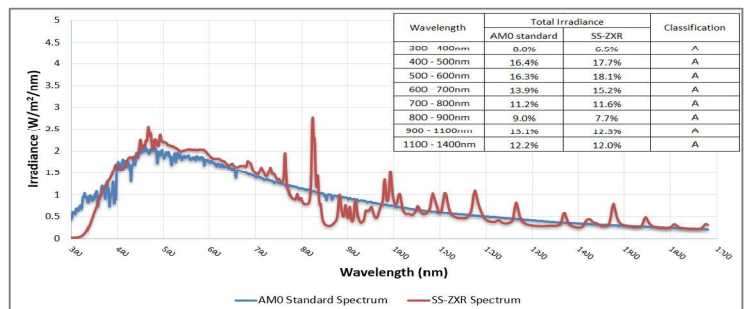
Specification

Model	Beam size
SS-ZXR100	100x100mm ²
SS-ZXR160	160x160mm ²
SS-ZXR180	180x180mm ²

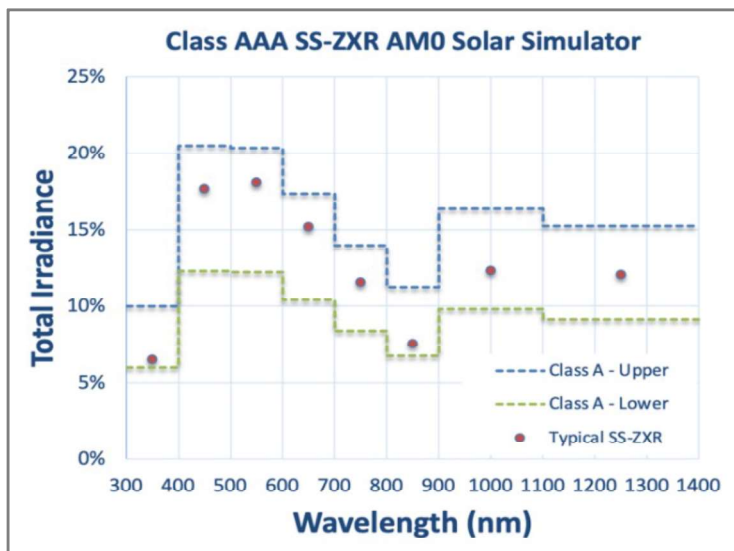
Testing Results / Publications



IV curve of crystalline Si solar cell tested by SS-ZXR at AM0 conditions (1366 W/m²). SS-ZXR has an excellent irradiance instability which makes the high repeatability of testing results (better than 99%).

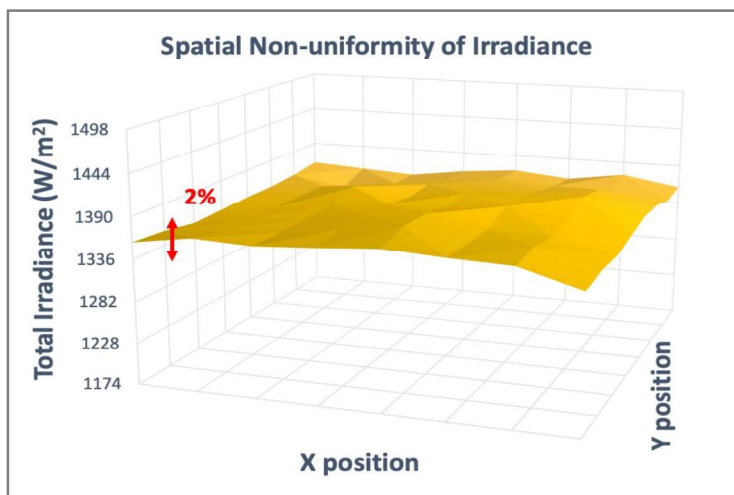


The spectrum and spectral rating of SS-ZXR solar simulator. Comparing to AM0 standard solar spectrum, each band of SS-ZXR reaches class A level.



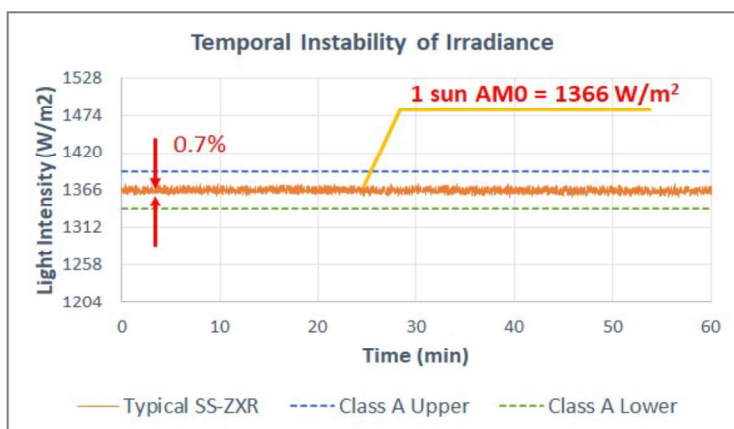
Spectral Rating of SS-ZXR

SS-ZXR spectral rating according to ASTM E927-10 AM0 solar simulator classification standard. The blue dotted line is the upper limit of the class A, and the green dotted line is the lower limit of the class A. The 8 rating wavelength bands of the SS-ZXR fall within the class A.



Spatial non-uniformity of SS-ZXR

Irradiance spatial non-uniformity testing results of SS-ZXR. The non-uniformity results are within 2% which is Class A level according to ASTM E927-10 for AM0 solar simulator classification standard.



Irradiance instability of SS-ZXR

Irradiance intensity instability testing results of SS-ZXR AM0 solar simulator over 60 minutes. The classification of intensity instability of SS-ZXR is class A level, which is smaller than 0.7 %, according to ASTM E927-10 AM0 solar simulator classification standard.

