

## ***Interactive comment on “A high dynamic radiation measurements instrument: the Bolometric Oscillation Sensor (BOS)” by P. Zhu et al.***

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Received and published: 6 February 2015

The authors do not provide enough details about the science objectives. They should clearly state why the TSI measurement is relevant for solar physics and space weather studies.

The total solar irradiance was direct indices about the solar activities. After the space based observations on the solar radiation with the absolute radiometer, the 12-years solar cycle discovered by the sunspot counting was confirmed again. However the physics behind the periodical activities is still under investigation. The PICARD mission is try to find the links between the variation of solar diameter and the variation of total solar irradiance. The BOS is designed to fill the gaps of the absolute radiometer

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measurements with 10 seconds cadence to provide the information about the solar acoustic modes. The space weather studies is more focused on the transient events such as solar flares. In order to avoid any hazardous impacts on the Earth from space weather change, we need well under the mechanics behind such kind of events and global solar activities.

Section 2. The Fig 2. could be bigger, especially the left part.

The Fig.2 is enlarged.

It is also not very clear to me how sections 4 and 5 are linked together?

There are mainly two kinds of phenomenon, which is influencing the measurements of BOS. One is the degradation of the instrument, which is discussed from the global measurements as well as the stellar pointing events. The send effects is the Lambertian performance, which is important for the correction of the terrestrial radiation measured with the sensor. The discussion here is prepared for a more detailed paper discussion the terrestrial radiation measured with BOS.

Could the authors provide an explanation why there is a strong disagreement between space observations and laboratory experiments? That would be an interesting link.

The disagreement between space observation and laboratory experiments, it is caused by the terrestrial radiation on the detector. The contribution of the outgoing terrestrial radiation is more complicated comparing to the solar one. The reflected visible and the reemitted thermal radiation is depending on the cloud coverage and the scene type at the field-of-view of the sensor. On the other hand, it is quiet impossible to simulate all those parameters at Lab. It is also logical, the noise level should be lower at the temperature controlled clean room.

I would also suggest adding the definition of a Lambertian detector.

In optics, Lambert's cosine law says that the radiant intensity or luminous intensity observed from an ideal diffusely reflecting surface or ideal diffuse radiator is directly

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proportional to the cosine of the angle  $\theta$  between the direction of the incident light and the surface normal.

Reference. Modern Optical Engineering, Warren J. Smith, McGraw-Hill, p.228, 256

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 4, 627, 2014.

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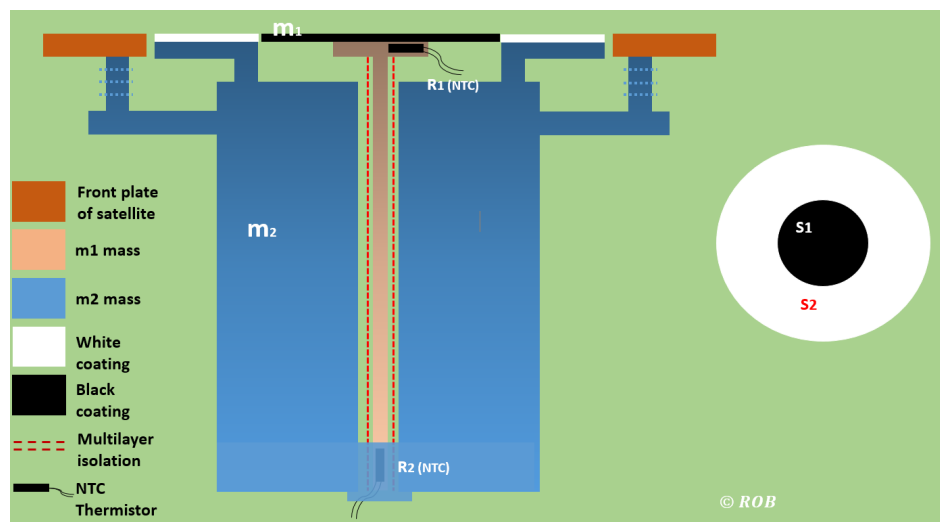


Fig. 1.

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