Preliminary Design of the Brazilian Experiential Broadband Radiometer

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The total solar irradiance (TSI) is a fundamental quantity to understand the evolution of the highly coupled Earth’s atmosphere/ocean system. However, its estimate requires very well calibrated and stable instruments. Here we discuss the system requirements and the preliminary design of the broadband radiometer that is being jointly developed by the Brazilian’s National Institute for Space Research (INPE) and the Brazilian’s National Laboratory for Astrophysics (LNA). The instrument is being designed to operate on artificial satellites with mass lower than 10 (ten) kilograms. Following the design of other radiometers, the instrument is composed of four quasi-identical active cavities and the corresponding precision apertures. The mass and dimensions of the platform impose strict constraints on the design of the radiometer. In special, the power available, pointing precision, and thermal structure of the platform affect directly the level of uncertainties and the operation of the instrument. On the other hand, the costs to develop and delivery dedicated low-mass platforms are low compared to current multi-instrument solar missions.