VUV calibration of the space-flight solar instrument SPICE at MLS

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There is a long lineage of space-flight imaging instruments for observation of the Sun, in the vacuum-UV and extreme-UV. These need radiometric calibration, i.e. known responsivity, in order to convert the signals measured on-board, into SI units of spectral-radiances for the mission's 'data product', as needed by the solar scientists. This calibration must be first established before flight, important also for proving that the instrument has the advertised sensitivity (i.e. that the quality in terms of contamination and ageing effects is good). In many cases the method is to use VUV transfer standard sources, which is convenient as the source can then be used at the lab where the instrument is being developed. But there are advantages to be gained by using a synchrotron light source, with the inconvenience that the instrument and its support-equipment then have to travel and be accommodated on the beam line. This was done for the new solar instrument SPICE (spectral imaging of the coronal environment), which is due to fly on the upcoming ESA mission Solar Orbiter. The PTB MLS synchrotron has an instrument facility for this purpose, and the prototype SPICE instrument was measured at PTB in September 2014. This talk will relate the experience and results from this visit, and discuss the issues around this approach versus the use of transfer-standard sources.