A UV-Visible instrument for limb based Venus observations. G. P. Gronoff[1] and C. Gray[2] and C. J. Mertens[3], and T. Slanger[4], [1]SSAI/NASA LaRC, Hampton, Va, Guillaume.P.Gronoff@nasa.gov [2]NMSU, candaceg@nmsu.edu, [3] NASA LaRC, Hampton, Va, Christopher.J.Mertens@nasa.gov, [4] SRI, Tom.Slanger@sri.com

Introduction:

In this presentation we demonstrate the need for a UV -Visible instrument for the limb observation of the nightside and dayside of Venus.

Observations of atmospheric emission allows for a multifaceted study of planetary atmospheres including analysis of atmospheric flow dynamics, chemistry, interactions with the solar wind, and how emission varies with time, space, and solar conditions. This is accomplished by comparing emission intensities and variabilities between multiple emission features across the UV and visible spectrum. While UV and visible at mospheric emission can be weak, particularly on the nightside of a planet, emission intensity increases at the limb where we have the greatest optical depth. Limb observations not only increase our signal-to-noise but also allows for altitude analysis of spectral lines.By constraining emission altitude we can determine the chemical process(es) leading to a given emission feature.

In the past decade, observations of the OI (1S-1D) transition at 557.7 nm (oxygen green line) in the nightside upper atmosphere of Venus has led to questions regarding the nature of this emission and if it is auroral in nature. The correlation between green line emission and coronal mass ejection (large plasma ejections from the Sun) impacts tends to indicate that the precipitation of energetic particle has a major role and that this emission is occurring deeper in the atmosphere than previously believed. By conducting limb observations of the Venusian nightside, we can determine the emitt ing altitude and constrain the chemical pathways responsible for this emission. In addition, other auroral lines such as the NII 575.4 nm and the oxygen UV lines at 297.2, 135.6, and 130.4 nm can be observed to determine if their intensity also increases with the green line and if this occurs similar altitudes.

The presence of such an instrument around Venus will also allow for the analysis of variations in density of the upper atmosphere on the dayside, allowing a better insight in the variations that were implied by the Venus Radio Experiment instrument. Finally, a spectra covering the UV and the Visible will allow the study of processes in the lower thermosphere, notably those involving the NO chemistry, leading to a better understanding of that transition region and its variation in temperature.