

Opto-mechanical design and analysis of Cubesat based NUV Spectrograph

A NUV (1800-3000 Å) spectrograph has been designed to investigate the diffuse nebulae and other extended sources. The spectrograph has been designed to fit into a 6U form factor (350 × 240 × 150 mm) Cubesat and will be launched into a low-earth orbit (LEO). Optical design, optimization, and tolerancing have been completed. Designs of mounting elements are in progress; stringent volume considerations restrict the optomechanical design of various subsystems. In this work, we present some of the work we have done in modeling the sub-assemblies and system-level assembly of the Cubesat. We have adopted an analysis methodology in such a way that we design each component and model by applying Finite Element Analysis using Ansys® software. Find the resulting deformations, validate the model and incorporate the corrections and improve it. The cycle will continue until we have a model with optimal performance. Once the subsystem level analysis is completed we will re-initiate the same model for complete system-level assemblies to improve and validate the design. Our aim is to arrive at an optomechanical model of the system such that it is reasonably lightweight and does not affect the optical performance of the spectrograph both in terms of mechanical integrity and thermal performance.