1 Introduction:

The main objective of this project is to design a polarization state generator that will be mounted on a mini-table using 1/4-20 screws. The object of the design is to make the system with the proper tolerances as well as the right material so that the system will be able to generate the proper polarization state. The light coming out of the system must be diverging as well.

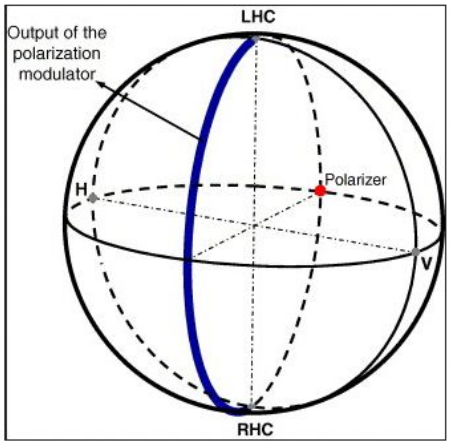

Figure 1: The Poincare Sphere

2 Determined parameters:

Requirement	**Value**	**Comment**
Polarization element diameters	2”	
stage ID	4”	
Laser to Polarizer Spacing	$50mm$	
Stage 1 to Stage 3 Spacing	$50mm$	
Laser to Stage 3 Spacing	$180mm$	
Stage 2 position	between 1 and 3	

3 Requirements:

3.1 Top Level Requirements:

Requirement	**Value**	**Comment**
Laser FOV	14°	
stage resolution	$10arcmin$	
stage range of travel	360°C	
stage speed	N/A	Manual control
Load limit	100 N	
Stage Parallelism tolerance	$< 80\mu m$	
Stage Concentricity tolerance	$< 80\mu m$	
Stage Wobble tolerance	$< 50\mu m$	
Spacing tolerance	$< 20\mu m$	

3.2 Operational Requirements:

Requirement	Value	Comment
Temperature range	$-20°$ C - $50°$ C	

3.3 Survival Requirements:

Requirement	Value	Comment
Temperature range	$0°$ C - $60°$	
Life time	3.10^6 Full turns	

3.4 Limitations:

Requirement	Value	Comment
Box Size	8 x 18 x 7	Portable
Materials	Aluminum 6061 Alloy	Except for purchase part
Weight	30LBF	Portable

3.5 Materials:

Requirement	Value	Comment
Stages	Stainless Steel	OPTO-SIGMA
Custom Patrs	Aluminum 6061 Alloy	
Posts and Post Holders	Stainless Steel	Edmund Optics

3.6 Interface requirements:

The system must be assembled on a mini-table using 1/4-20

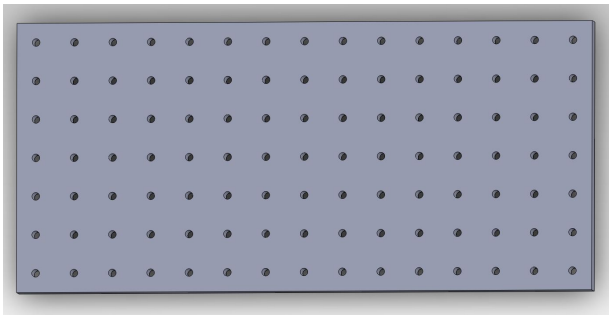

Figure 2: Interface