# Test Procedure for Telescope System Calibration and Spectral Resolution Analysis

Test Procedure ID: [Your Unique Identifier]

Test Engineer: [Your Name]

Date: 04/08/2024

Professor: [Professor's Name]

Course/Project Name: [Course or Project Name]

1. Objective:

This test procedure documents the work performed on the telescope system for the purpose of calibrating the optical alignment, improving spectral resolution, and conducting a detailed analysis of quantum defects. The goal is to achieve a spectral resolution of 0.5 nm and ensure that the system is properly aligned to analyze spectral features, using both a 50 mm slit and a CA-doublet light source.

2. Test Setup and Components:

2.1. Telescope System

- Optical System: Telescope with adjustable focal length.

- Slit Size: 50 mm.

- Detector: Flat CCD detector.

- Light Source (Initial): White light source.

- Light Source (Final): CA-doublet light source.

2.2. Test Equipment

- Telescope Focal Length: [Enter focal length of your telescope, e.g., 50 mm].

- CCD Specifications: [Enter CCD specifications such as pixel size, resolution, etc.].

- Slit Tool: [Include specifications, e.g., width, material, etc.].

- Optical Components: [List lenses, diffraction gratings, or any other components used in the optical path].

2.3. Environmental Conditions

- Test Environment: [Enter details, e.g., room temperature, controlled lighting conditions, or any factors that might affect measurements].

- External Interference Considerations: [List any factors like ambient light, vibrations, etc., that may impact the results].

3. Procedure Overview:

3.1. Initial Calibration:

Step 1: Set up the telescope system with the 50 mm slit and CCD detector.

Step 2: Adjust the telescope to ensure the image is projected clearly onto the CCD, ensuring that the discrete dots of spectral features are visible.

Step 3: Record the initial images from the white light source to verify that the telescope system can resolve individual spectral lines.

Expected Outcome: Clear and resolved spectral lines on the CCD, showing discrete dots.

9. Appendix (Optional):

A1. CCD Images: [Insert before and after images of spectral lines captured during the test]

A2. Calibration Test Data: [Insert the data collected during calibration tests, such as initial spectral line measurements and focusing data]

A3. Initial Realignment Images: [Insert images showing the re-alignment process before and after adjustments]

A4. Code Utilized: [Insert the code you used for data acquisition, processing, and analysis of the spectral lines]

Test Engineer’s Signature:

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_