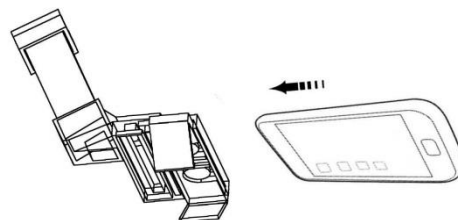


## Instructions

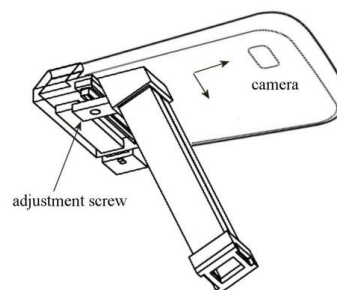
A spectroscope can be used to observe electronic transitions. A diffraction grating is used to separate light into its component wavelengths. The spectroscope is composed of a slit (a), diffraction grating/telescope (b), and scale (c). The slit produces parallel or collimated light, which is then separated into component wavelengths by the diffraction grating. The scale will be generated by your smartphone by calibrating it against known emission lines.

### Part A. View a continuous light source.

1. Attach the spectroscope to a smartphone by sliding the phone through the adjustable clips (see adjacent figure labelled step 1).
2. Align phone camera with scope (see adjacent figure labelled step 2).
3. Expose the spectroscope as at a continuous light source, such as an incandescent bulb or the indirect sunlight. Adjust the angle so that only a single rainbow appears. You may have to shield the space between the phone and scope with your hand to block out stray light.
4. Adjust the slit and zoom so that the image of the rainbow appears approximately between 400 and 700 nm. The slit is adjusted manually, and the zoom buttons on the app change the size of the image.



Step 1. Attach scope to smartphone



Step 2. Align camera to scope viewport

### Part B. Calibration using a smartphone application.

1. View either a mercury emission tube or fluorescent source to calibrate the scope.
2. Toggle to the appropriate reference spectrum in the app, and adjust the zoom and slit until the camera image and reference image are aligned.
3. Toggle back to the scale. Your scope is now calibrated!