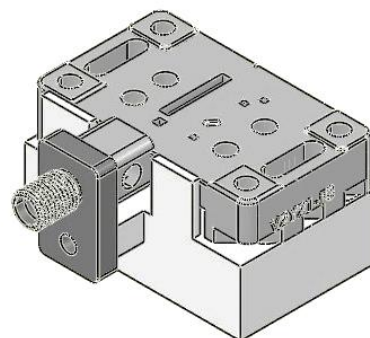# *Small & Powerful*

> **Pleroma** is a **spectrometer** integrated with optical MEMS chip and an image sensor developed by **Spectrochip Inc.**. Light to be measured is guided into the entrance port of Pleroma (e.g. through an optical fiber) and the spectrum measured with the built-in image sensor is output from the CSI port for data acquisition. Pleroma allow accurate measurement with low noise.
>
> Pleroma comes with evaluation software and **Python** source code that allows settings of measurement conditions, acquiring and saving data, and displaying graphs. Pleroma is designed to take full advantage of open-source feature of **Raspberry Pi Single Board Computer (SBC)** - the most widely distributed SBC - for quick and easy customization of user applications.

➢ Features

- Flat-field micro concave grating chip
- Highly accurate optical characteristics
- Direct connection to Raspberry Pi SBC
- Python source code available
- Compact design for easy integration

➢ Applications

- Spectrophotometer
- Component analysis in food, agriculture, etc.
- Process control for chemical products
- Water content measurement
- Chromogenic reader

➢ Spectral

Item		Specification	Unit
Spectral dispersion principle		Flat-field[1] micro concave grating chip	-
Spectral range		300 ~ 1000	nm
Spectral resolution (FWHM)	**Typ.**	5	nm
	Max.	7	
Wavelength reproducibility		$\pm$0.375	nm
Stray light[2]		0.04	%

[1]: Flat-field focusing is achieved by aberration-corrected concave grating design.
[2]: Stray light is measured using an image sensor with 12-bit A/D conversion.

➢ Electrical

Item	Specification	Unit
A/D conversion	8	bits
Integration time (shutter)	0 ~ 1,000,000	μs
Total noise level[3,4]	1.1	%
Interface[5]	CSI camera connector	-
Power consumption	158	mW

*3: Electrical noise of this image sensor with 8-bit A/D conversion is 1.1%. Using an image sensor with more bit number of A/D conversion will greatly increase the signal-to-noise ratio.
*4: The total noise level is the Gaussian sum of the electrical noise and the optical noise (stray light).
*5: Connected to Raspberry Pi SBC.

➢ Mechanical / Optical

Item		Specification	Unit
Dimensions (W × D × H)	**Module with Stand**	44.00 × 42.78 × 26.25	mm
	Module	44.00 × 35.60 × 11.60	mm
Weight (including optical fiber stand)		12	g
Image sensor type		OV9281	-
Number of spectral pixels		1,280	pixel
Input optical solid angle		24	degree
Connector for optical fiber		SMA905	-

➢ Temperature

Item	Specification	Unit
Operating temperature[6]	+5 ~ +35	°C
Storage temperature	-20 ~ +70	°C

*6: No dew condensation. When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.
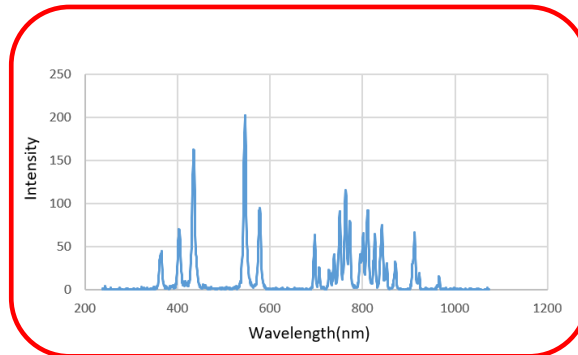
➢ Optical Component Layout

Pleroma Spectrometer uses a micro concave grating chip, making it possible to deliver high throughput and highly accurate optical characteristics.
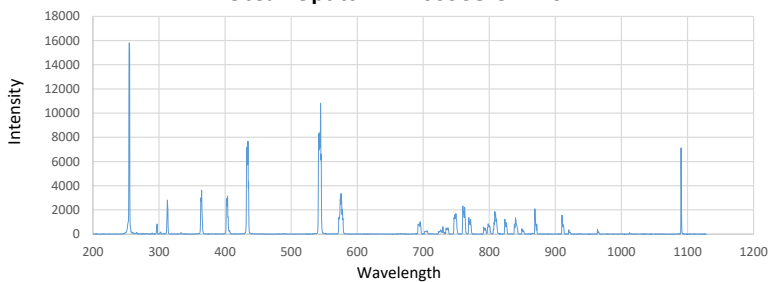

Image Sensor   Spectrochip   Input light source
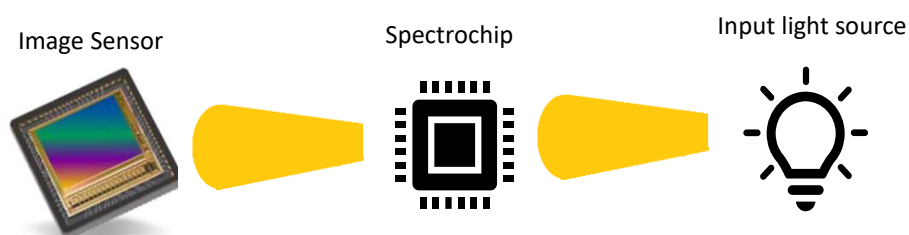
➢ **Hg-Ar Lamp Spectrum**

Pleroma Spectrometer – Raspberry Pi Version

Other Brands
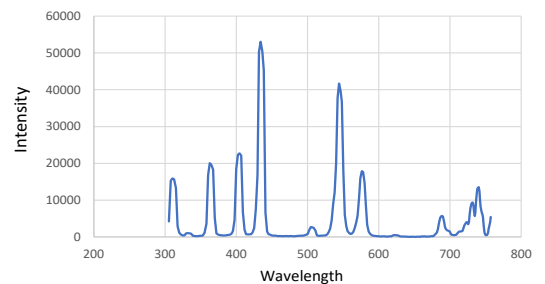
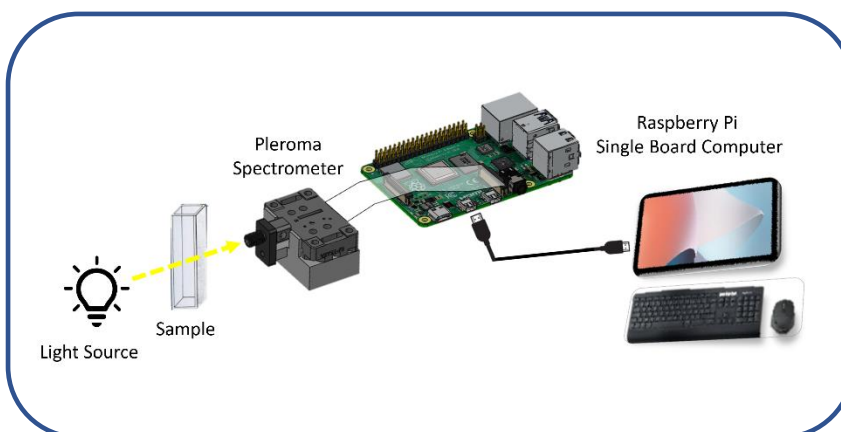➢ **Application Example: Transmission Measurement**

Light to be measured is guided into the entrance port of **Pleroma Spectrometer** through the sample and the acquired spectrum is output via the CSI port to a Raspberry Pi SBC. There are no moving parts inside the unit, so stable measurements are always obtained.
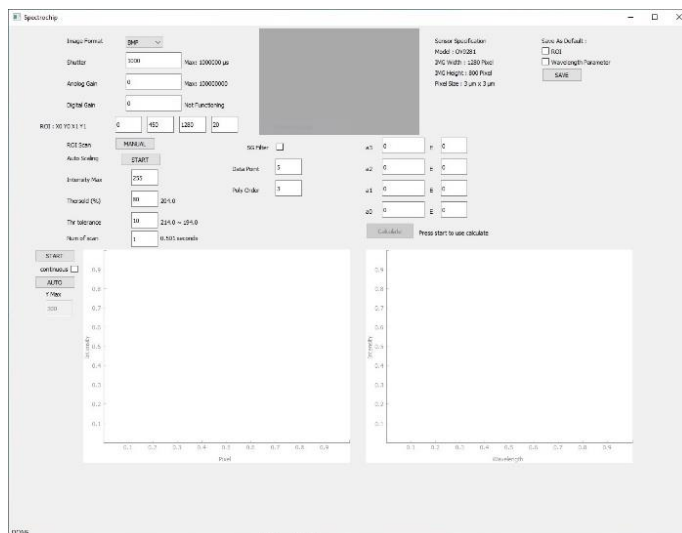
➢ **Tool Kit**

Software, source code, user manual, and CAD files can be downloaded at the following link:

https://github.com/SpectroChip/spectrochip.git

If you need any support, please email to service@spectrochips.com.

➢ **Dimension (unit: mm)**

Pleroma with SMA905 Connector   Pleroma Spectrometer

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Tel :	**+886 3 5520892**
E-Mail :	**service@spectrochips.com**
Download :	**https://github.com/SpectroChip/spectrochip.git**