

Object

Common Name	Heart + Soul Nebula
Alternate Name	IC1805, IC1848, LBN667
Visual Magnitude	6,5
Distance ► Object	7.500 ly
Apparent Size	4.38° x 3.01°
Object R.A.	02h 44m 02.524s
Object DEC	+61° 15' 29.691"
WikiLink	https://www.jpl.nasa.gov/images/pia13112-heart-and-soul

Heart+Soul



20231117-200716_Heart+Soul_ZWOASI294_0002-01.jpg

Link ► Picture	Heart+Soul_20231117
Description	Emission Nebulae
Constellation	Cassiopeia

Picture Data

Work Status	Published	Quality	*****
Format	Photo	Picture Center R.A.	02h 42m 58.864s
Tot./Act. Frames/Pane	20 20	Picture Center DEC	+61° 11' 10.684"
H / V Panes	3 3	H/V FoV [°]	5,4804 3,7303
Exp. [s] / Frame	180	Above horizon [°]	0
Total Time / Pane [min]	540,00 60,00	View Direction	N

Camera Data

ZWO	ASI294MC-Pro	ZWOASI294	
Camera Angle [°]	0	Pixel Pitch [µm]	4,63
Gain or ISO	120	Camera Temp. °C	-10

Observation Data

Observation Start	2023-11-17T20:07:16 UTC+/- +h	Observation End	2023-11-18T05:48:10
Observation Site	ES La Palma Jardin	Site Elevation /Bortle	470 3
Province	La Palma	Site Coordinates	28° 38' 52.0" N, 017° 53' 47.

Sky & Moon

Sky Quality	1,12	Outside Temp. °C	23
Seeing Index 1	5	Seeing Index 2	4
Moon Phase	1st quarter	Moon Age [d]	3
Moon Percent %	15	Distance► Target	UNKNOWN
MoonRise	11:46:00	MoonSet	21:59:00

Optical Config.

TS600AS294	TS600AS294E100T78		
Lens or Scope	TS600	FocalLength [mm]	599
Type Of Build	APO Triplet Refractor	Diameter [mm]	90
Brand	TS-Optics	Aperture / f-stop	6,66
Additional Optics	M63 WO Rotator	DawesLimitLink	1,74 Arcsec
Filter	-	Optical Scale ["/px]	1,595
Focuser	TS600 Rack + Pinion	EAF Position	20542
Focuser Position	63,67		

Other Hardware & Software

GuideScope	ZWO 30/120 mini	Mount	EQ6R-PRO
GuiderHW	ASIAIR	SessionControl	ASIAIR
GuiderSW	ASIAIR	PostProcessingSW	PixInsight

More ...

Work Folder	2023\20231117-200716_Heart+Soul_La-Palma-Jardin
Comment	Measure image properties: 4.99 x 3.32 deg, radius: 2.996 deg, Up is 177.0 degrees E of N by
Remarks	1. Session Planning The mosaic session was planned using ASIAR Preview for camera rotation and SkyAtlas.

The mosaic consists of 9 panes, each containing 20 frames of 20x 180 seconds => 60 minutes per pane.

```
+-----+-----+-----+
| Pane 1-1 | Pane 1-2 | Pane 1-3 |
+-----+-----+-----+
| Pane 2-1 | Pane 2-2 | Pane 2-3 |
+-----+-----+-----+
| Pane 3-1 | Pane 3-2 | Pane 3-3 |
+-----+-----+-----+
```

2. Location and sky

All light frames were taken on La Palma (Canary Islands, Spain) at about 500 meters above sea level, sky index was 4.5 (really good) and 0% clouds.

3. Session Results

The capture took about 9 hours in one night, starting at 20:07:16 in the evening and ending at 05:48:10 the next morning.

4. Plate Solving and Camera Rotation Results

ASIAIR rotation planning in SkyAtlas: 179.2° at the first pane

Astrometry.net measurement: final cropped picture details: 4.99 x 3.32 deg, radius: 2.996 deg, Up is **177.0** degrees E of N, Center (RA, hms):02h 42m 58.864s, Center (Dec, dms):+61° 11' 10.684"

5. Post Processing

Post processing in PixInsight:

- Step 1: created subfolders `..\work\work1-1` to `..\work\work3-3` for the post processing steps in PI
- Step 2: **WBPP (weighted batch post processing)** on each pane (pane 1-1 thought pane 3-3) in the subfolders of step 1 for image selection, registration, debayering and integration to create master light frames like `masterLight_BIN-1_4144x2822_EXPOSURE-180.00s_FILTER-NoFilter_RGB.xisf`
- Step 3: rename the master light frames to include the pane number, e.g. `masterLight_1-1_BIN-1_4144x2822_EXPOSURE-180.00s_FILTER-NoFilter_RGB.xisf`
- Step 4: applied **PCC (Photometric Color Correction)** on each of the master files
- Step 5: applied SCNR to de-green the master light frames, resulting file names like: `masterLight_1-1_BIN-1_4144x2822_EXPOSURE-180.00s_FILTER-NoFilter_RGB_PCC_SCNR.xisf`
- Step 6: **StarIntegration** started. Unfortunately a one-step integration attempt to integrate all panes at once failed completely, so the panes were therefore integrated pane by pane:
 - Step 6.1: integrated pane 1-1 (rotated by 180°) and pane 2-1 => mosaic 11_21
 - Step 6.2: integrated pane 11_21 and pane 2-2 => mosaic 11_21_22
 - Step 6.3: and so on until...
 - Step 6.9: final integration of pane 3-3 into mosaic 11_21_22_12_31_23_32 => `masterLight_BIN_1_4144x2822_EXPOSURE_180_00s_FILTER_NoFilter_RGB_PCC_SCNR_mosaic_3x3.xisf`
 - **NOTE:** The **star integration** only worked with previews on the overlapping image section, otherwise the integration sometimes failed.
- Step 7: Performed dynamic cropping by rotating and cropping the light frame to cut off all unused parts of the image.
- Step 8: ABE (Automatic Background Extraction) performed
- Step 9: ML (Multiscale Linear Transform) performed on both luminance and chrominance
- Step 10: created a fully stretched final picture using Screen Transfer Function (STF) and Histogram Transfer (HT) and saved the resulting image as:
 - 20231117-200716_Heart+Soul_ZWOASI294_0002_FULL.xisf and
 - 20231117-200716_Heart+Soul_ZWOASI294_0002_FULL.jpg
- Step 11: applied **selective color boost** in Photoshop to bring out the faint nebulae
- Step 12: imported the final `20231117-200716_Heart+Soul_ZWOASI294_0002-01.jpg` into Lightroom Classic and added tags
- Step 13: ran the image through **StarlustDB**, **ThumbsPlus** and **FotoManager** for final tagging

and resizing

No color or hue changes have been applied; the final image is showing natural colors.

6. Lessons Learned

- The chosen pane overlap of 10% was almost too small, had the target been further away from the ecliptic, the small overlap would have resulted in image gaps.
- Also, a **meridian flip** occurred between horizontal panes 1 and (2 and 3), mosaic integration failed initially until the affected images were rotated 180°, losing all astrometric data.

7. Main logfile entries

see log file Autorun_Log_2023-11-17_193251.txt in work folder [..\Astro\Observations\2023\20231117-200716_Heart+Soul_La-Palma-Jardin\logs](#)