

Graxpert Addendum to PixinSight Workflows

There are two versions of GraXpert, the older stable release 3.02 which does not include Deconvolution and the newer pre-release version which includes all functions including Deconvolution. It has been in pre-release since Jan 1, 2025. To use GraXpert Deconvolution within Pixinsight and standalone you will need to install both versions. To use GraXpert only in stand alone version just install **Version 3.1.0rc2**

Graxpert Version 3.02

This version provides the Pixinsight integration script, gradient correction, and noise reduction but not deconvolution. Install this Graxpert script by installing as follows. Use “RESOURCES => Updates=> “Manage Repositories” and “add”

<https://PixInsight.deepskyforge.com/update/graxpert-process/>

Then RESOURCES => Updates =>. Check for Updates. This will install the current stable release (**Version 3.0.2**) and the integration script so you must always install this version first.

Graxpert can then be found under <All Processes> => GraXpert.

Running this will open the GraXpert menu where we can access all the capabilities except Deconvolution. There are some issues with different operating systems see here for updates: <https://github.com/Steffenhir/GraXpert/issues>.

Download this older version first to get the script.

Graxpert Version 3.1.0rc2

A pre-release version, which includes Deconvolution, and a new interface. You download this version from:

<https://github.com/Steffenhir/GraXpert/releases>

Beta versions of GraXpert are published here so it is always worth checking.

Make sure you download the installer for your operating system **from the section marked , 3.1.0rc2 Under “Assets”**

Once you have downloaded this version you will be able to use it with the previously installed script or as a stand alone system. The script only offers indirect access to Deconvolution. (see next page) The stand alone system handles Pixinsight XISF files and all GraXpert functions directly. For this reason, many people prefer using it outside of Pixinsight.

IMPORTANT: If you have not used the AI Interpolation model before **you need to be connected to the internet** as Graxpert will download them. Therefore its worth doing a test run of Star and Object Deconvolution and Noise reduction to force this download. You can then use GraXpert off-line,

GraXpert and Pixinsight

GraXpert provides functions for Cropping; Background Extraction; Deconvolution and Denoising. Cropping is well provided for within Pixinsight, either by the autocrop function within WBPP or by Pixinsight Dynamic Crop.

GraXpert Background Extraction and PixInsight Gradient Correction (GC) are used for the same fundamental purpose: removing unwanted artificial or natural gradients (light pollution, vignetting, moonlight) from astrophotography images. Both tools aim to produce a flat, neutral background while preserving the signal of the subject (nebula, galaxy, etc.). So we don't need that.

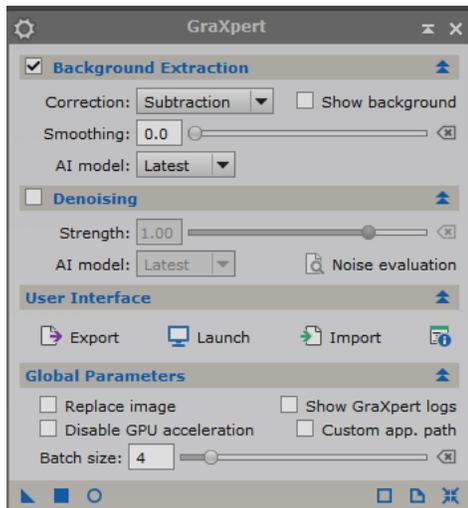
Deconvolution and Denoising are the two added value functions of GraXpert we will use.

GraXpert can be used with Pixinsight in two ways: First, having saved our work from Pixinsight we can open GraXpert as a stand alone application and read, the .XISF file directly and then save it when done. This is often the easiest way. If you are going to do that just skip to the next page.

Using GraXpert From Pixinsight

To start GraXpert within Pixinsight go to **<All Processes> => GraXpert.**

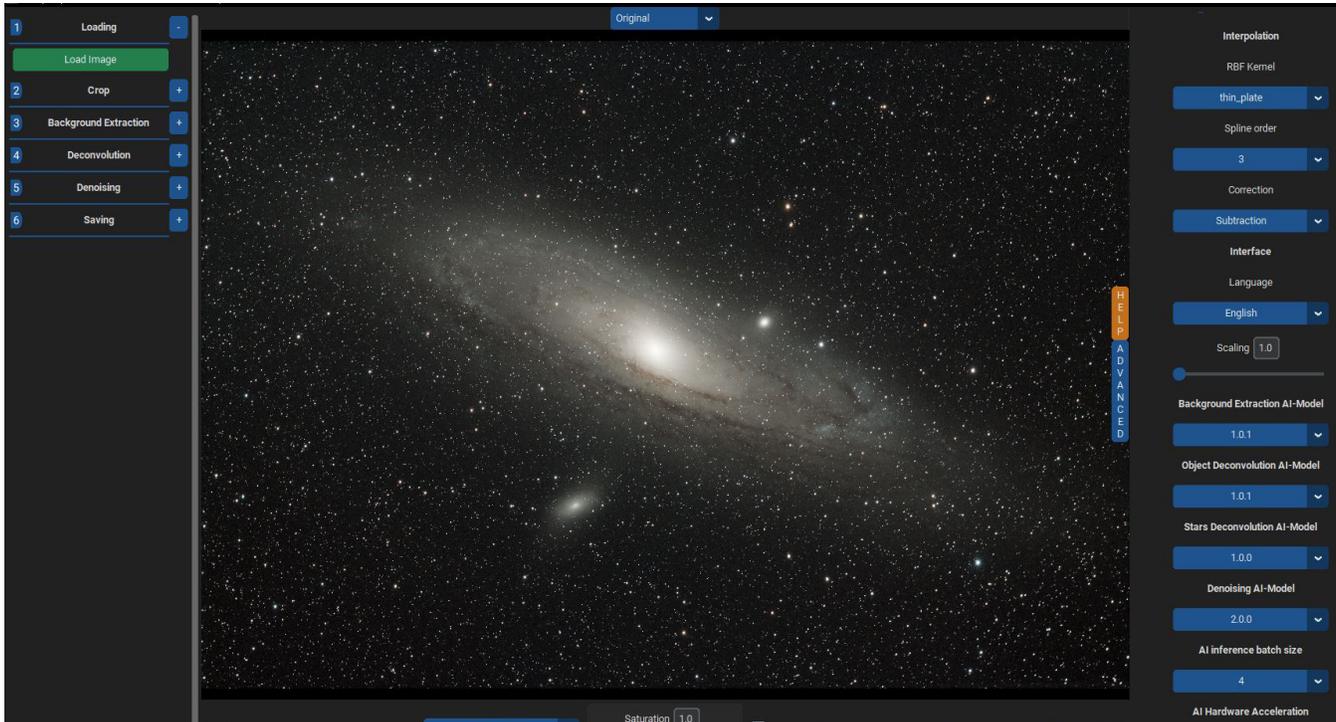
Running this will open the *GraXpert* menu where we can access Background Extraction and Denoising. Of these we will only be using Denoising. If you want to get to Deconvolution from this menu you must click the small "Launch" icon and it will start the Stand alone version!!



If you have not used the AI Interpolation model before **you need to be connected to the internet** as GraXpert will download them.

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The GraXpert Stand Alone Menu

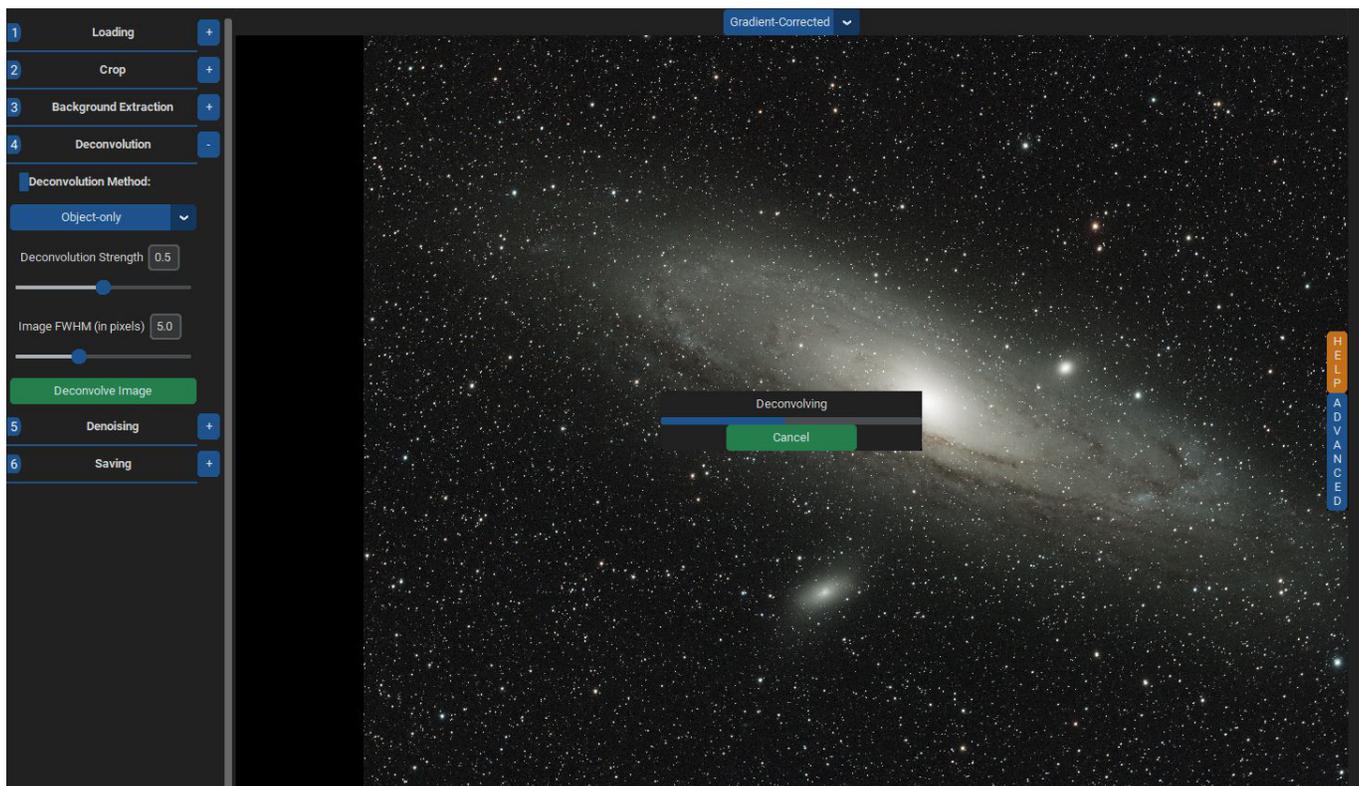


GraXpert has a reputation for excellent Gradient Removal and Noise Reduction. It has recently added Deconvolution. Fortunately it also handles 32 bit .XISFs files, so we can minimise **Pixinsight and open GraXpert.**

Load our file: M31GrSp.xisf by clicking the Plus sign against the **“Loading”** menu item on the left.

The interface is very straightforward. On the right-hand side, you should open the **ADVANCED** menu. You will see a list of AI models with a version selected underneath them. Leave these values at their default for now. You will also see a menu item for *AI Hardware Acceleration* that is set to **“on”** by default. **If you have problems with GraXpert, you should try with this option turned “off.”**

The bottom menu allows you to select the stretch view. By default, it is set to **“10% Bg, 3 sigma.”**, This is **view only** and does not affect the image. This image is linear, so choose a view strength that helps you see the detail. Use the mouse wheel to zoom in and out, and the mouse to move the image around in the frame.



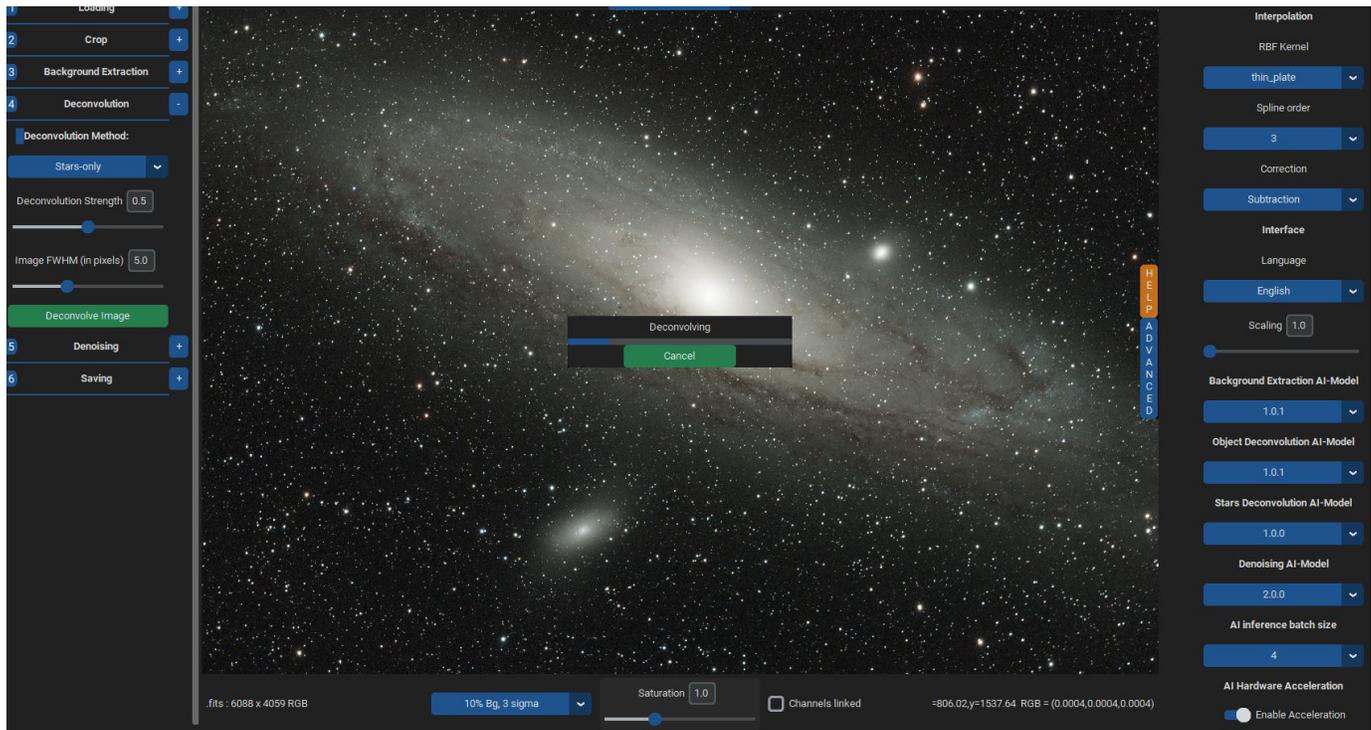
Deconvolution

Here we try to sharpen the image, improve the shape of stars, and improve the detail in nebulosity. Graxpert does this in two stages: **Object Deconvolution** (The background nebulosity) and **Stars**. We will need to save our image between each stage. Click the “Advanced” Menu on the right and scroll down to view and choose the **“Object Deconvolution AI-Model”** and the **“Stars Deconvolution Model”**

Object Deconvolution

Press the plus next to “*Deconvolution*” and choose “*Object Only*” from the menu. Leave the other values as default and press “*Deconvolve Image*”. If you have not used the AI Interpolation model before, you will see a message to automatically download it.

After a short while, it completes. Compare before and after using the menu at the top centre. In this case, the detail in the rim of M31 is much clearer. Save the image as 32bit XISF ***M31GrSpDo.xisf***. or similar (If you run deconvolution on the stars without saving, the object deconvolution is lost.)



Stars Deconvolution

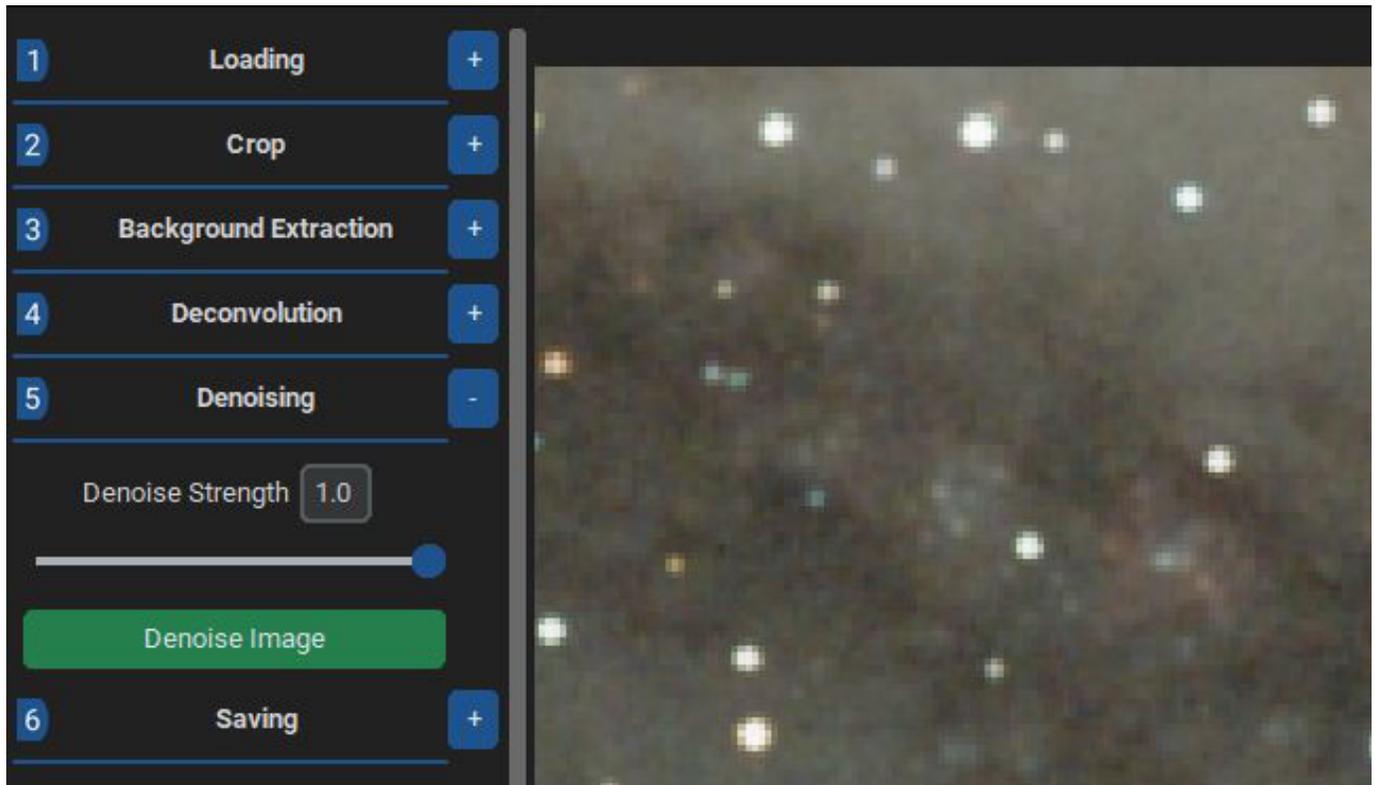
Press the plus sign next to “*Deconvolution*” and this time select “*Stars Only*” from the menu. Leave the other values as defaults and click “*Deconvolve Image*.” After a short while, it will complete. Zoom in and compare the stars before and after, particularly at the edges, using the menu at the top centre. The difference can be dramatic. As before GrXpert will download the AI model the first time you use it. Save the image as 32bit XISF ***M31GrSpDos.xisf***



Before



After



Denoise

For Denoise, zoom in on an area with detail. Select the plus sign to reveal the denoise menu. The default value for *Denoise Strength* is 0.5, so it is worth trying that. If this is your first time using AI Denoise, you will receive a message prompting you to download it automatically. You can increase this up to a value of 1 but you might blur detail.

The top menu provides a *before-and-after* view of the image. The results I achieve are very impressive. Save the 32-bit “*processed*” version of this image as a .XISF file: ***M31GrSpGx.xisf***, to remind us that it’s been through all GraXpert processes.

Now close GraXpert, and “Open” this file in Pixinsight

Remember this is still a Linear image so we want to set display mode to “*Autostretch*”.