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Next-Generation Background Removal for Astronomical Images based on Diffusion Models

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One of the main challenges in astronomical imaging is getting as much signal as possible with as little noise as possible. The better the signal, the more sure one can be that the science done with the images is sound. However increasing the signal-to-noise-ratio on the detector is hard and expensive. Therefore a lot of research is focused on improving post-processing techniques to gain as much information from images as possible.

We introduce BGRem, a tool to remove the background noise for optical astronomical images. It leverages a state-of-the-art diffusion model combined with an attention U-net architecture, ensuring precise and reliable background removal without affecting the sources much. It has also shown to increase the performance of Source extractors Source localisation feature when used as a pre-processing step.

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