ABSTRACT:
Planetary nebulae are one of the Hα emission nebulae, which are essential to study the nucleosynthesis and mass-loss physics of intermediate-mass stars in the late stage. However, due to the complexity of this process and the limitation of the samples, there are still many problems to solve in this area. Planetary nebulae are rare objects with a variety of morphology and surface brightness distribution, most of which are very faint and hidden in dense star fields, so it is hard to search for more of them. The traditional method of Eyeballing takes time, so this project used the novel deep learning algorithm Swin-transformer to search for the planetary nebulae. IPHAS and VPHAS+ are the highest-resolution Hα surveys until now, and VPHAS+ just finished most of the observation without massive searching, so it has a significant potential for discovery. This project searched in IPHAS and VPHAS+, generated a candidate list, and then select promising ones to obtain the statistical information. Finally, this project did spectral follow-ups and studied the physics properties of these targets.