

# Discovery of new QSOs by means of Canonical Correlation Analysis and photometric catalogs.

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The several astronomical surveys carried on in the past, and those currently ongoing, produced a huge amount of data stored in their legacy catalogs. Besides the primary scientific goals pursued by the individual experiments, there probably is a lot of information hidden in those databases, still waiting to be extracted. This task is of crucial importance both because it provides further knowledge without requiring new instruments/experiments, and (most importantly) because the experience acquired in digging up legacy databases will allow us to properly exploit the overwhelming volume of data coming from the astronomical facilities in the next decade.

In this talk I will present a new method to discover new, high-redshift ( $z > 2.5$ ) QSOs using Canonical Correlation Analysis on photometric catalogs in the optical and infrared wavelengths. We focused our attention on the Southern Hemisphere, since (historically) dedicated QSO observations have been carried out mainly in the North, and took advantage of the recent Skymapper survey, being carried on from the Siding Spring Observatory in Australia.

We cross-correlated the Skymapper photometric catalog with the GAIA, 2MASS and WISE databases and applied our method in order to find new QSOs among the sources without an object type classification. We also carried on a few observations at La Silla and Las Campanas Observatories in order to test our predictions, and discovered 119 new, bright ( $i < 18$ ), QSOs with  $z$  in the range 2.5 - 4.89. The method proved to be very efficient, with a success rate of new QSOs identification of  $\sim 70\%$ , and an estimated completeness of  $\sim 90\%$ .

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