

**An increased star formation rate in quasar host galaxies
at high redshift: following the trend of galaxies**

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Abstract

From the 2010 edition of the QSO/AGN catalog by Véron-Cetty & Véron, we selected a list of 51748 QSOs within a redshift range from 0.03 to 5.0, and extracted 4-band photometry in the mid infrared (MIR) from the all-sky catalogue of the Wide-field Infrared Survey Explorer (WISE). Using a new diagnostic diagram (Coziol et al. 2014), we show that the QSO's MIR colors systematically change with the redshift. Based on an analysis of the spectral energy distribution we show that this transition in colors is consistent with a gradual increase of star formation in QSO host galaxies from $z < 1$ to $z \sim 4$, where star formation is at its maximum, possibly decreasing beyond this redshift. Coincidentally, this apparent evolution in star formation in hosts of QSOs seems to follow not only the increase with redshift of star formation in galaxies, as established based on the Hubble Space Telescope Deep Field Survey (e.g. Madau et al. 1998), but also the evolution of the luminosity density of QSOs in the universe (e.g. Boyle & Terlevich 1998). Our observations support the view that the formation of black holes in AGNs happens in parallel with the formation of their host galaxies.