GAIA INITIAL QUASAR CATALOGUE - UPDATES: MORPHOLOGY AND VARIABILITY

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ABSTRACT. The present version of the GAIA Initial QSO catalogue (GIQC_III) contains 174,744 sources, divided in 3 categories: defining (full reliability, 123,880 sources), candidate (lacking full confirmation of redshift or magnitude or pointlikeness, 24,229 sources), and other (pending confirmation of two or more characteristics, 26,235 sources). The GIQC_III now includes morphological indexes, as derived from the study of the target's PSF from DSS R, B, and I plates, in comparison with at least 6 well imaged neighbor stars. A study was also made on the relationship between optical flux long term variability and the centroid's random walk. For that, classes of objects most prone to exhibit such relationship can be discussed.

1. LATEST IMPLEMENTATIONS

In recent years there was a significant increase of number of optically bright quasars for which an ICRF related astrometric position can be derived, along with an improvement of the evenness of their sky distribution (Véron-Cetty & Véron, 2006; Souchay et al., 2008). This enabled to build an optical representation of the ICRS, the LQRF (Andrei et al., 2009) formed by 100,165 QSOs all-sky distributed.

This answers to the requirements such as from micro and macro lensing, binaries, and space density counts, as well as the requirements of space astronomy missions. In particular, for the forthcoming GAIA mission an Initial Quasar Catalogue is being compiled. The workpackage is formed by the authors of this contribution. A.-M. Gontier belonged to this workpackage and her absence will be sorrowly felt.

RA (deg)	DEC (deg)	MAG	z	Rshr	Rsrn	Rgrn	Bshr	Bsrn	Bgrn	Ishr	Isrn	Igrn	Class
0.000000	-0.032778	19.40	1.560										C P
0.002083	-0.450833	20.09	0.250										O F
0.005291	-2.033269	19.29	1.356	0.75	0.10	0.13							D
0.005735	-30.607458	19.18	1.143	0.20	0.01	0.91							D
0.007326	-31.373790	19.74	1.331	0.73	0.44	0.00				1.82	1.14	1.37	D
0.011279	-25.193609	21.56	1.314										O F
0.012178	-35.059062	17.09	0.508	0.59	0.20	0.27				0.39	0.80	0.07	D
0.022792	-27.419533	19.11	1.930	0.12	1.01	0.41							D
0.027500	0.515278	20.37	1.823										D S
0.033333	-63.593333	17.00	0.136										C A
0.034167	0.276389	20.03	1.837										D S
0.038604	15.298477	19.40	1.199	0.92	0.02	0.30	0.36	0.92	0.08	1.11	1.51	1.46	D S
0.039089	13.938450	18.29	2.240	0.59	0.23	0.14	0.63	0.91	0.09	2.07	0.16	1.43	D S

Figure 1: The first lines of the GAIA Initial Quasar Catalogue - GIQC_III. RA and DEC are self-explanatory. And so is the redshift (z) on the 4th column. MAG is V whenever available. When it is not g, r, or the weighted average of the available colors. It follows 3 groups (from the DSS R, B, and I plates) of 3 PSF estimators (SHARP, SROUND, and GROUND) for which the closer to 0, the more stellar-like is the QSO PSF (in the local photometric standard). The first Class column is either **D**efining, **C**andidate, or **O**ther. The second Class column is **S**DSS source (for **D**s); either **I**CRF source, optically point-like **A**GN, or **P**oor observational history (for **C**s); and either **E**mpty field, low precision **R**adio position, **U**nreliable detection, or optically **F**aint (for **O**s).

The latest version of the GAIA Initial Quasar Catalogue (GIQC_III) contains 174,744 sources, divided in 3 categories: defining (full reliability, 123,880 sources), candidate (lacking full confirmation of redshift or magnitude or pointlikeness, 24,229 sources), and other (pending confirmation of two or more characteristics, 26,235 sources). The GIQC_III includes morphological indexes, as derived from the study of the target's PSF from DSS R, B, and I plates, in comparison with at least 6 well imaged neighbor stars. It also includes the most reliable positions, magnitudes, and redshifts. Figure 1 presents an extract of the GIQC_III. The catalogue may be consulted on demand to oat1@on.br (A.Andrei)

2. THE MORPHOLOGICAL INDEXES

The morphological indexes were determined from 5x5 arcmin cuts of B, R, I DSS images. At least 6 well imaged are retained as comparison to the quasar's PSF. The IRAF measures SHARP (probing skewness), SROUND (probing roundness), and GROUND (probing normalness) define the indexes. The robustness of the morphological indexes was verified by a trial bench on 1,343 R images for which also the SDSS DR7 images (0.396arcsec/px) were retrieved. The results show that the PSF analysis reproduces well the SDSS star/galaxy separator and that the DSS plates perform much alike to the SDSS frames. The excess (rate of objects beyond 2 σ) of non-stellar quasars is significant as given by all the indicators, on both the DSS2 and DR7 images, measured either against the field stars or the SDSS classified stars.

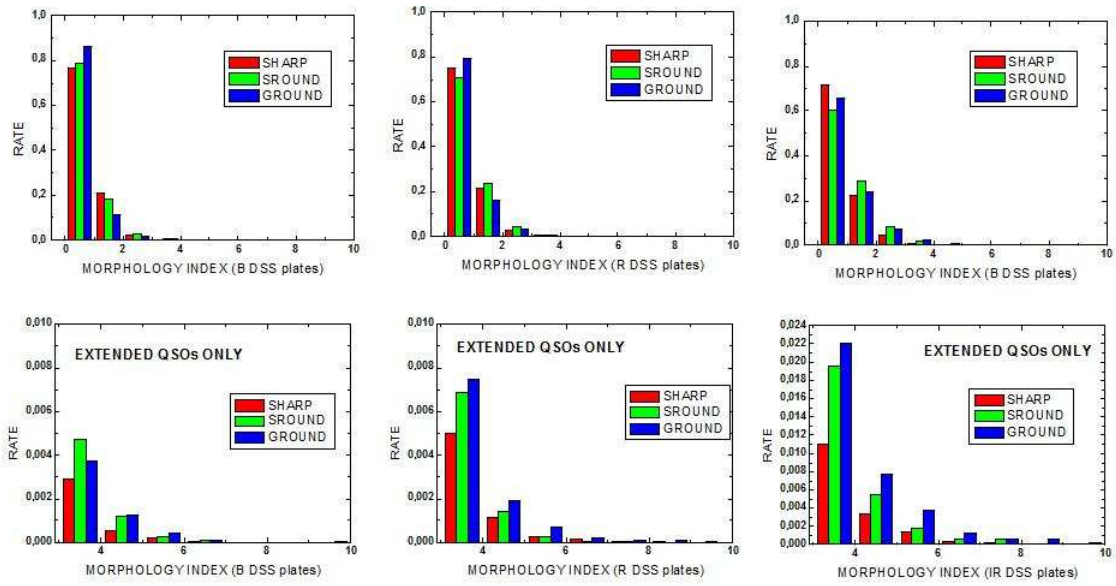

Figure 2: Histograms of the morphological indexes are shown on the upper row. The second row zooms the histograms into the region of non-pointlikeness. It is evident that the degree of non-pointlikeness varies along the spectrum. The bluer the QSO is looked to, the deeper into the power force it is perused, and the more pointlike it looks. Notice that the atmosphere transparency works right against this.

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3. REFERENCES

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