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Quasars and the Gaia preliminary first data release

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The Gaia preliminary first data release (GDR1) is scheduled for the forthcoming September 16th, once complied the internal data validation. It will bring positions and G magnitudes, and the respective errors, for about 90% of the sky observable by Gaia. In addition a full astrometric solution will be given for the Tycho2 stars. As much as, it still is far away from the end-of-mission Galactic census, by a comparable much the GDR1 will be ahead away from the astrometric catalogues existing at the time of its release. In particular, we will detail the use of QSOs from the Gaia initial QSO catalogue (GIQC) to establish the celestial reference frame for the GDR1, and to set up the zero-point enabling to disentangle parallaxes from proper motions in the Gaia-Tycho2 full solution. Tied to this the GIQC is reviewed, with emphasis on its sky distribution, and the quality assessment, morphology and variability flags. Finally, an ongoing investigation on the proprieties of the QSOs spectral energy distribution (SED) is presented, including a new algorithm for the determination of absolute magnitudes. It is derived from the Gaia spectral library and it is thus important to interpret the QSOs luminosity function from the more than half a million QSOs that Gaia is expected to detect.

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Gravitational radiation by point particle eccentric binary systems in the linearized characteristic formulation of general relativity

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We have studied a binary system composed of point particles of unequal masses in eccentric orbits in the linear regime of the characteristic formulation of general relativity, generalizing a previous study found in the literature in which a system of equal masses in circular orbits were considered. We also showed that the boundary conditions on the time-like world tubes generated by the orbits of the particles can be extended beyond circular orbits. Concerning the power lost by the emission of gravitational waves, it was directly obtained from the Bondi's news function. It is worth stressing that our results are completely consistent, because we obtained the same result for the power derived by Peters and Mathews, in a different approach, in their seminal paper of 1963. In addition, the present study constitutes a powerful tool to construct extraction schemes in the characteristic formalism to obtain the gravitational radiation produced by binary systems during the inspiralling phase.

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