Lyra mission: establishing a standard system for stellar photometry

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One of the most important tasks of the Lyra mission is to create a dense all-sky grid of high-precision photometric standards.

The total number of standards should be on the order of several million, and to achieve this goal, more than 300 million stars will be measured in the course of the mission.

The system must contain standards in all ranges of magnitudes from the brightest stars down to 16th magnitude. The low random error will be achieved by providing sufficient signal strength in all passbands and using highly accurate and stable detecting equipment. The random error of measured magnitudes is expected to be 0m.001 – 0m.003 and about 0m.01 for stars brighter than 14th magnitude and fainter stars, respectively.

The system must be free from systematic errors, which are to be minimized by careful ground-based calibration and by maintaining this calibration throughout the mission using an earlier developed method of check measurements.

Standard stars should be non-variable and allow unambiguous transformation of their magnitudes into any other photometric system with passbands in the optical range. Throughout the mission, each program star is to be measured, on average, 100 times in 10 photometric bands, allowing stars exhibiting no variations greater than 0m.001 – 0m.003 to be selected using the correlation method of variability detection (Baltic Astronomy, v.12, p.629, 2003). Photometric data in 10 passbands will make it possible to confidently choose stars whose spectral energy distributions allowi their magnitudes to be transformed from the Lyra system into other photometric systems.

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