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The Clementine Gnomon (1702) recalibrated to measure stellar aberration

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The stellar aberration was discovered by James Bradley in 1727, and the same astronomer discovered the nutation of the Earth's axis in 1737. At the meridian line of S. Maria degli Angeli, the giant Clementine Gnomon, built by Francesco Bianchini (1662-1729) and funded by Cardinal Gianfrancesco Albani (1649-1721), elected pope on 23 november 1700 with the name of Clement XI, the effects of stellar aberration have been detected on the Polaris, and on Sirius.

The aberration of the Polaris influenced the measure of the latitude.

The aberration on Sirius affected the instant of the equinoxes and the solstices, calculated with the difference between solar and stellar meridian transit, the latter observed also in full daylight. To obtain such evidence of the first special relativistic effect observable, a complete calibration of the meridian line has been carried since 2018. With the IGEA observational campaign (Informatized Geometric Ephemerides for Astrometry) nearly all the reference points of the 45 meters long meridian line have been calibrated, by comparing solar observations and ephemerides. On MG11 (2006) the evidences of Polaris' aberration were discovered in the latitude measured by Bianchini at the Gnomon, and now MG16 we can afford the evidences on Sirius. The eccentricity of the Earth's orbit in 1703 and now can be also measured with such instrument.

References

Calibration of the Clementine Gnomon with IGEA observational campaign
Teaching Relativity with the Clementine Gnomon, 2021

Primary author: SIGISMONDI, Costantino (ICRA Sapienza and ICRANET Pescara)

Presenter: SIGISMONDI, Costantino (ICRA Sapienza and ICRANET Pescara)

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