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Observation in Senegal of an asteroid by stellar occultation



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Observatoire de Paris - PSL Centre de recherche en astronomie et
astrophysique

During the night of September 23rd to 24th, 2020, an international scientific cooperation, mobilizing Senegalese, Belgian and French researchers - from IRD, CNRS, the Observatoire de la Côte d'Azur, the University of Côte d'Azur, the Observatoire de Paris - PSL and the University Paris-Saclay - allowed to observe for the first time a star occultation by (15094) Polymèle, a Trojan asteroid of Jupiter. This observation campaign, which is part of the preparations for NASA's Lucy space mission, marks a new milestone for West African astronomy.

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Coordinated by NASA, the Lucy space mission will begin in October 2021 for 12 years. Its objective : to fly over an asteroid in the main belt and six Trojan asteroids of Jupiter, in order to improve knowledge about the origin of the planets and the formation of the Solar System.

A preparatory step for the flyby is for astronomers to determine the size and shape of the asteroids. This measurement is carried out when they pass in front of a star, a phenomenon called "stellar occultation".



Dispositif d'observation de l'occultation stellaire au Sénégal

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On the night of September 23-24, 2020, researchers succeeded in observing a stellar occultation by (15094), Polymer, the smallest of the six asteroids, which will be flown by the Lucy mission in 2027.

Sponsored by NASA and entrusted to the Senegalese Association for the Promotion of Astronomy (ASPA) by Marc Buie (Southwest Research Institute), this observation mobilized about forty researchers, with the support of IRD and CNRS. Fourteen telescopes were deployed at different observation sites in the Fatick and Kaolack region of Senegal.

The intensive training of the researchers in the use of the 20 cm diameter mobile telescopes and acquisition systems, sent by NASA to Senegal, took place the three nights before the occultation at Fatick.

Despite the development of a large storm cell over the Kaolack region on the night of the observation, the strategy of deploying the telescopes proved effective in observing the stellar occultation.

The collected data will allow to obtain a first estimate of the size of the Polymer asteroid, while the shape of the object will be specified by the next observation campaigns.

Developing research in astronomy in Senegal

This successful observation campaign, carried out overwhelmingly by Senegalese astronomers, marks an important step in the development of astronomical research in Senegal. These actions illustrate a coordinated effort to promote astronomical and space sciences in Africa, led since 2017 by an international consortium of researchers : the African Initiative for Planetary and Space Sciences.

During an observation campaign in 2018, 50 American, 7 French and 21 Senegalese researchers had already succeeded in observing the last occultation of the asteroid Arrokoth, before it was overflown in January 2019 by the New Horizons probe.