The sickle-cell patient who became a space physicist.

Aziz grew up in Dabou, Côte d’Ivoire, a small town not far from Abidjan. From an early age, he was curious about what was going on in the sky. He attended the Bessio De Lambert Modern Secondary School and the Tiapani Dominique High School, where he obtained his scientific baccalaureate, an examination for university entrance. His academic journey led him to Senegal to study physics and chemistry. Following two years of general studies in these subjects, he went on to specialize in physics, graduating with a master’s degree in the subject.

With his degree in hand, he returned to his homeland. Aziz enrolled in a master’s degree program in external geophysics with a specialization in geomagnetism and aeronomy at the Université Félix Houphouët-Boigny in Abidjan. It was in the second year of his master’s degree program that his adventure in research really began. In 2015, he had the opportunity to participate in a workshop centered on the effects of the ionosphere on Satellite-Based Augmentation System (SBAS) and Ground-Based Augmentation System (GBAS) applications at the International Centre for Theoretical Physics (ICTP) in Trieste, Italy. After defending his master’s degree, Aziz began his studies in a doctorate program in atmospheric physics. His specialization remained in geomagnetism and aeronomy. The title of his thesis was, “Estimation of diurnal EB vertical drift velocities in the F region of the equatorial ionosphere using magnetic data from the IEEY (International Equatorial Electrojet Year) and the AMBER (African Meridian B-Field Education and Research) network in West Africa.”

The vertical drift velocity of the plasma controls the distribution of ions and electrons within the E and F regions (the ionosphere is divided into 3 regions: D, E, and F) of the equatorial ionosphere. Notably, the electron density irregularities within the F region, the equatorial electrojet intensity (EEJ), and the equatorial ionization anomaly (EIA) are strongly influenced by the vertical drift of the plasma at low latitudes. Knowledge of the vertical drift speed of plasma at low latitudes is therefore of vital importance in understanding the phenomena and processes observed in the equatorial ionosphere.
However, the difficulty of obtaining effective measurements of this important parameter in all sectors of longitude means that we have to resort to alternative methods.

The method employed by Aziz in his work was based on the strong correlation between the magnetic variation associated with the EEJ and the vertical drift velocity of the plasma within the F region of the equatorial ionosphere, as demonstrated in the work of Anderson et al. (2004) [1]. This methodology was chosen on the greater availability of magnetic measurements in all longitude sectors. This work was published in the journal Advances in Space Research [2] and was awarded the International Radio Scientific Union (URSI) Young Scientist Award in 2020 [3]. The Young Scientist Awards are presented at the General Assemblies of URSI and at the URSI Atlantic Radio Science Conferences (AT-RASC) to recognize an international group of individuals that has made innovative contributions and discoveries in multidisciplinary research related to electromagnetic fields and waves.

The PhD journey has not been easy for Aziz, as he has had many interruptions due to his illness. Aziz was born with a hereditary condition called sickle cell disease, a crippling ailment that can manifest at any time. When he had his attacks, the most serious ones could keep him in bed for two months. Two months without being able to make any progress with his research. It was difficult, but he managed to overcome it all.

This was also an enriching experience for Aziz, as during his PhD studies, he participated in several conferences in countries such as Italy, India, the United States, Cyprus, Austria, China, and Kenya. These conferences enabled him to forge links with many researchers around the world, which will be of great use to him in the rest of his career.

In 2021, Aziz Diaby took the initiative to establish an association in response to the lack of knowledge of space science among the people around him. With the help of his laboratory colleagues, he created the Ivorian Association of Astronomy [4]. The aim of the Association is to promote science in general through astronomy. Why astronomy? Because astronomy is a science that encompasses fields such as computing, mathematics, physics, chemistry, biology, and beyond. The activities of this association include engaging with pupils, students, and the general public to help them discover astronomy through lectures and debates, training workshops, and telescope observations of the sky. Additionally, Aziz and his association actively participate in international campaigns to locate asteroids. To date, they have discovered approximately ten asteroids.

For all his efforts to promote space science through astronomy in his country, Aziz Diaby was appointed as Astronomy National Outreach Coordinator by the International Astronomical Union (IAU) in 2022. Today, he is a lecturer-researcher in the physics department at the Université Félix Houphouët-Boigny in Abidjan and divides his time between teaching and research at the university, and promoting astronomy.

Through all his efforts, he hopes to inspire young people to pursue studies in science, particularly space science, so that one day Côte d’Ivoire can enter the space race.

Figure 2: Aziz (beige pants) in an observation session with students. (Photo Credit: Alain Martial Ahondjon)