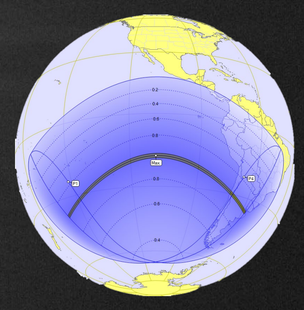
TOTAL ECLIPSE CHILE 2019:

SOLAR CORONA POLARIZATION and EARTH'S IONOSPHERE



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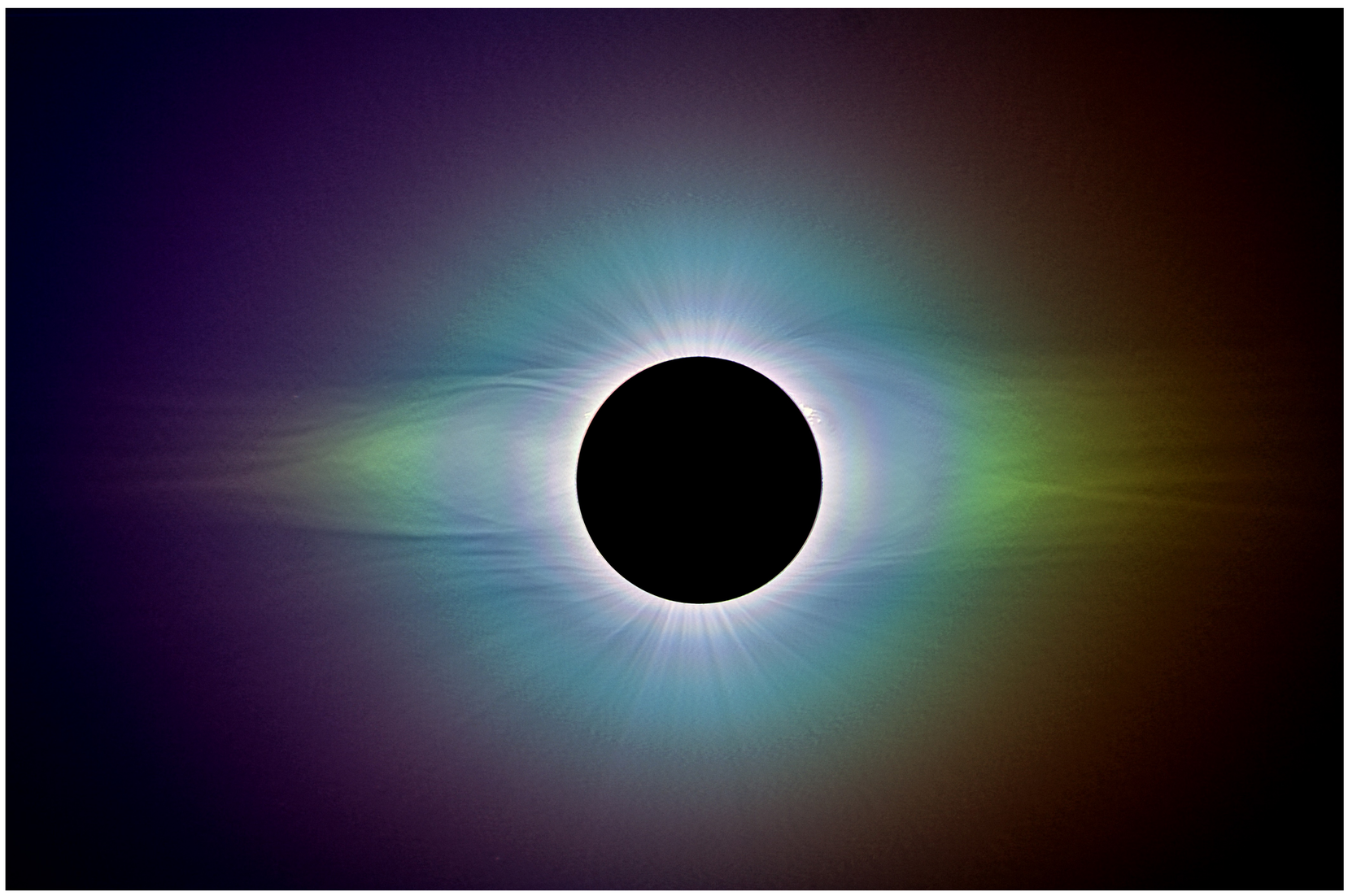
Solar Corona Polarization

The Solar Corona is the outer layer of the Sun Atmosphere. It is composed by plasma extending million of km. Due to its low density it is masked by the Sun Photosphere. Although the Outer Corona is observable with coronagraphs, the Inner Corona can be seen directly only during total eclipses. The Solar corona displays a continuous emission spectrum strongly polarized (K-corona). It arises out of photosphere light scattered by the coronal gas free electrons (Thomson scattering) oriented by the Sun magnetic field. Other contributions are produced by dust diffraction near the observer (F-corona) and hence it is un-polarized. Polarization is an excellent tool to diagnose key plasma parameters (magnetic fields, densities, temperatures, velocities, etc.) to better understand complex coronal phenomena, such as the solar activity, coronal heating and the acceleration of the solar wind.

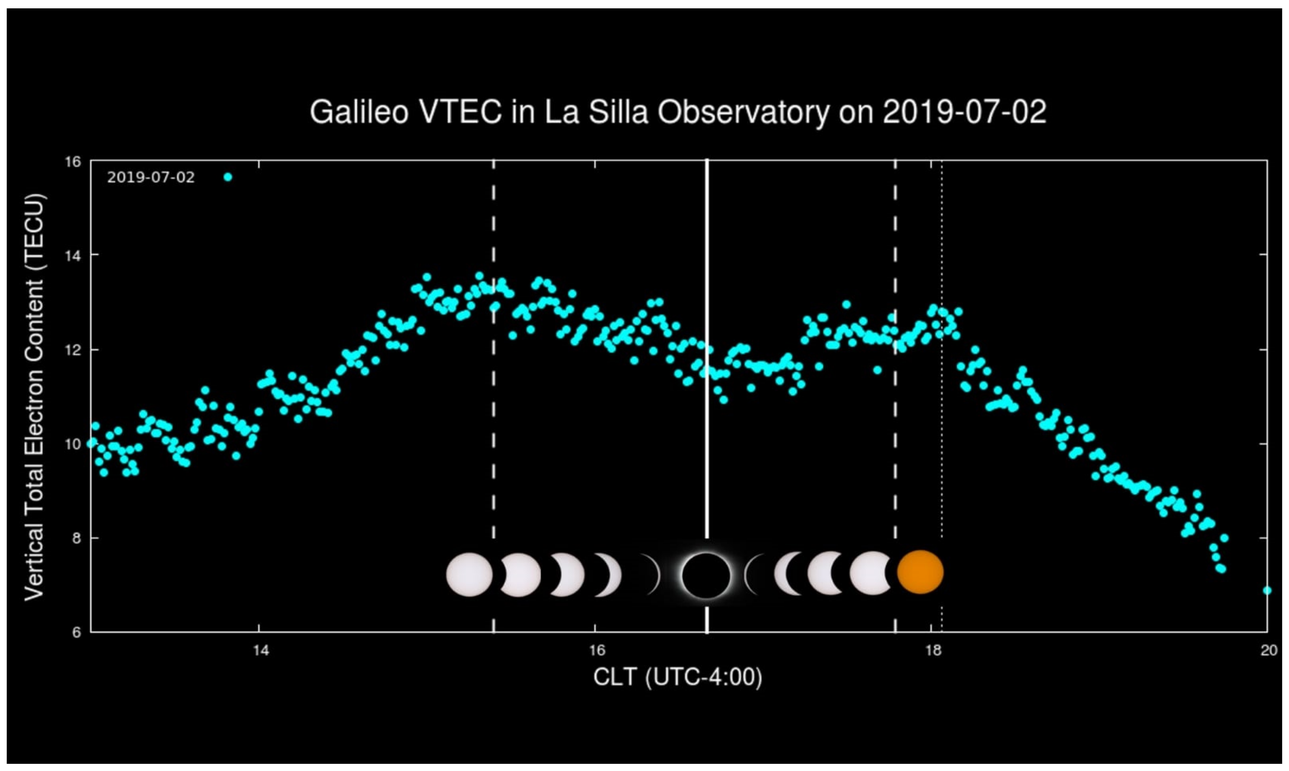


This image has been composed from different combinations of polarized images during totality, Chile 2019, to bring out the details of the structures in the corona.

UNIVERSITÀ DEGLI STUDI DI TORINO

GNSS Measurements of the Ionosphere

Measurement with a multi-constellation and multiband GNSS/Galileo receiver of changes in Earth's Ionosphere caused by the Moon's shadow transit over the observation area. Ionisations in the ionosphere which is associated with the solar radiation during a total eclipse provides a good opportunity to study the ionosphere irregularities. Using global navigation satellite system (GNSS) data taken from multi-band and multi-constellation it is possible to analyze the total electron content (TEC) variation. Effect well known from long time ago. Most of these analysis produced 2D ionosphere data. With the data of TSE 2019 it is intended to perform a tomographic analysis of the ionosphere during the eclipse to derive 3D information. The equipment used is provided by the Galileo Science Office at ESAC and it is the same that was used in Antarctica by the GESTA project (Galileo Experimentation & Scientific Tests in Antarctica) to study at high latitudes the effect of solar activity in the ionosphere. GNSS Antenna navXperience 3G+C, GNSS Receiver Septentrio PolarRx5.



http://cesar.esa.int/index.php?Section=Total_Eclipse_2019