Il lascito di Angelo Secchi: Studio della connessione Sole-Terra

Francesco Berrilli

Dipartimento di Fisica, Università di Roma Tor Vergata
Accademia Nazionale dei Lincei

francesco.berrilli@roma2.infn.it
https://www.fisica.uniroma2.it/~solare/en

Why Do Science?

For understanding \ For utility	N	Y
N		**Edison**
Y	**Bohr**	**Pasteur**

Adapted from Donald Stokes (Woodrow Wilson School for Public and International Affairs, Princeton University)

AIA 171 - 2014/03/04 - 10:30:12Z

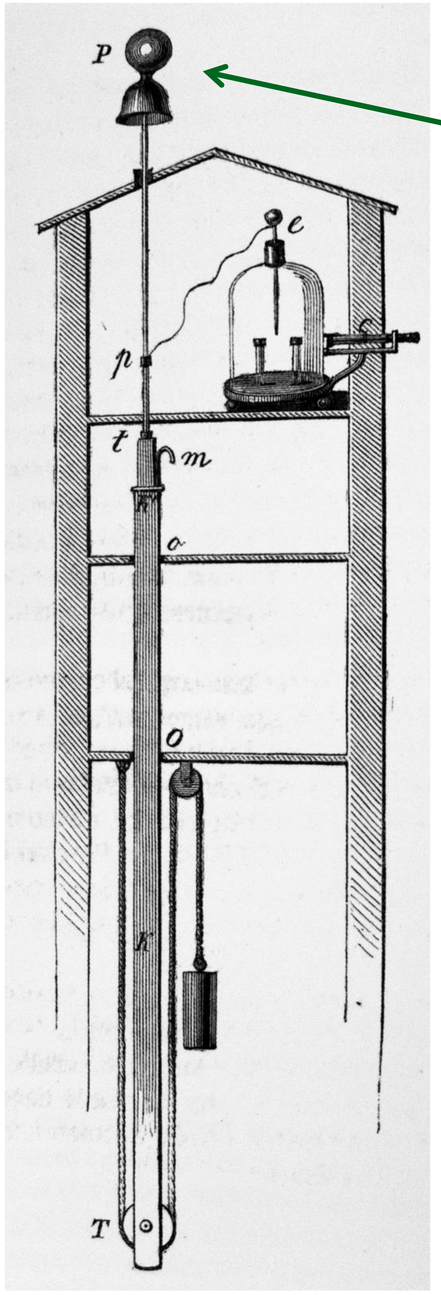
Space Weather - Science in the Pasteur Mode

- How a star works
- How it affects humanity's home
- How to live with a star

Adapted NASA Living With a Star: The Sun-Earth Connection

- NASA - Living With a Star Program
- ESA - Space Situational Awareness Space Weather
- ASI - National Scientific Data Center for Space Weather

chiesa di Sant'Ignazio di Loyola in Campo Marzio

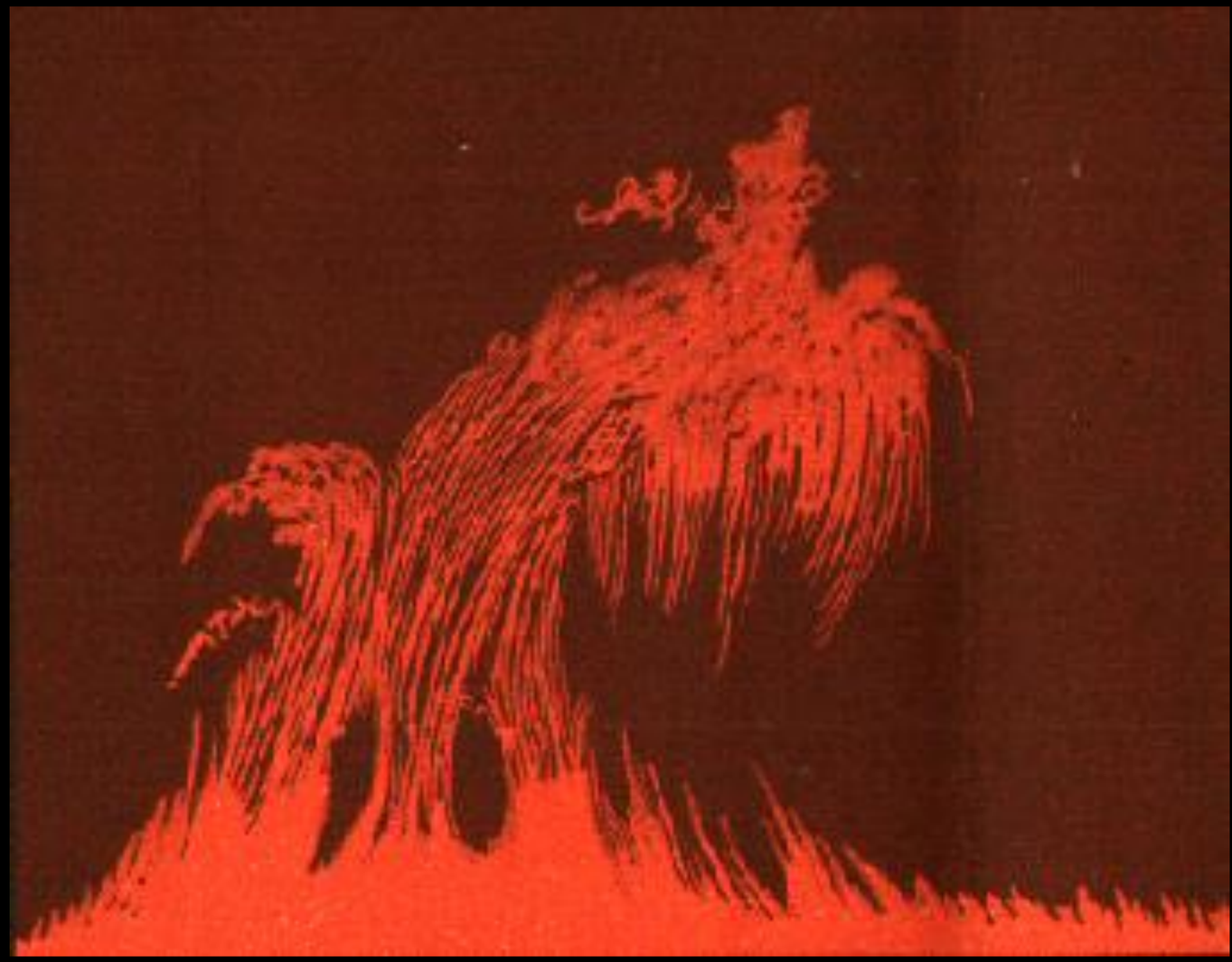


1 – Observatory with the Merz telescope.
3 - Elliptical observatory for the meridian circle of Ertel.
4 - Observatory with the Cauchoix telescope.
5 - Electric turret observatory with the small ball conductor.
7 - Bundle of electric cables for the transmission of the signals of the meteorological sensors located on the Calandrelli Tower to the automatic Meteorograph .
11 - Median Terrace of the Calandrelli Tower.

Secchi understands that the study of sunspots should not be separated from that of the solar prominences.

He realized that prominences are more numerous in active regions of sunspots where appear brighter regions, which he calls “faculae” (Latin for "little torch").

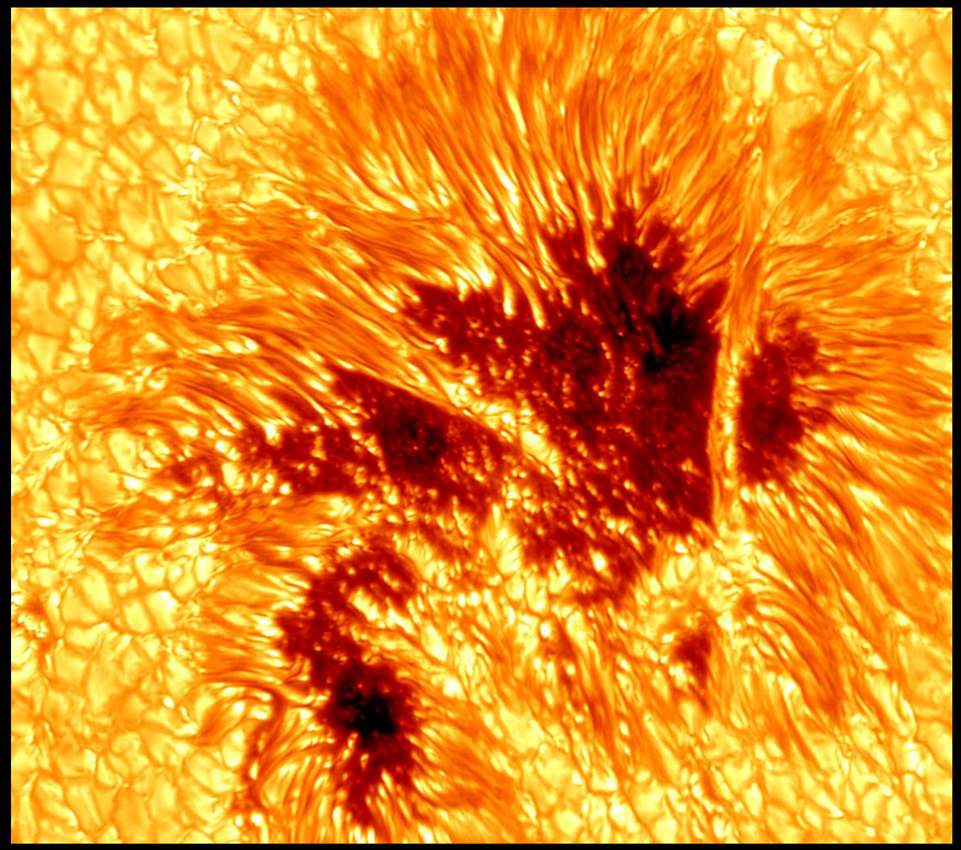
In these regions typically solar eruptions take place.



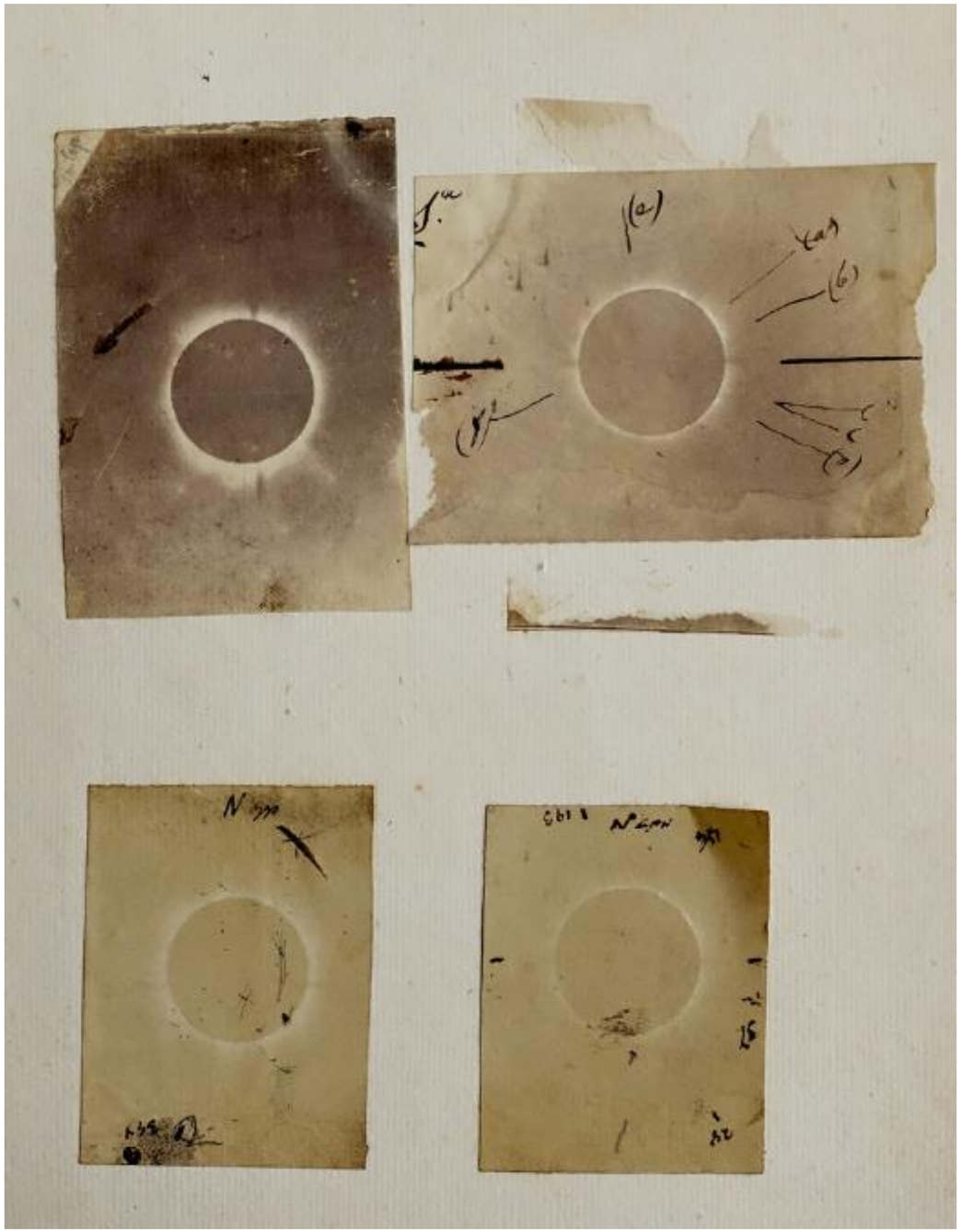
Certainly, the ability to report the details of sunspots is a central aspect of Secchi's solar observations (and in general naked-eye observers).

Only the recent introduction of solar extended-sources AO techniques has made possible to achieve similar details.

Ricerche spettrali sul Sole, A. Secchi , Frenze, 1870



Big Bear Solar Observatory, California, 2013

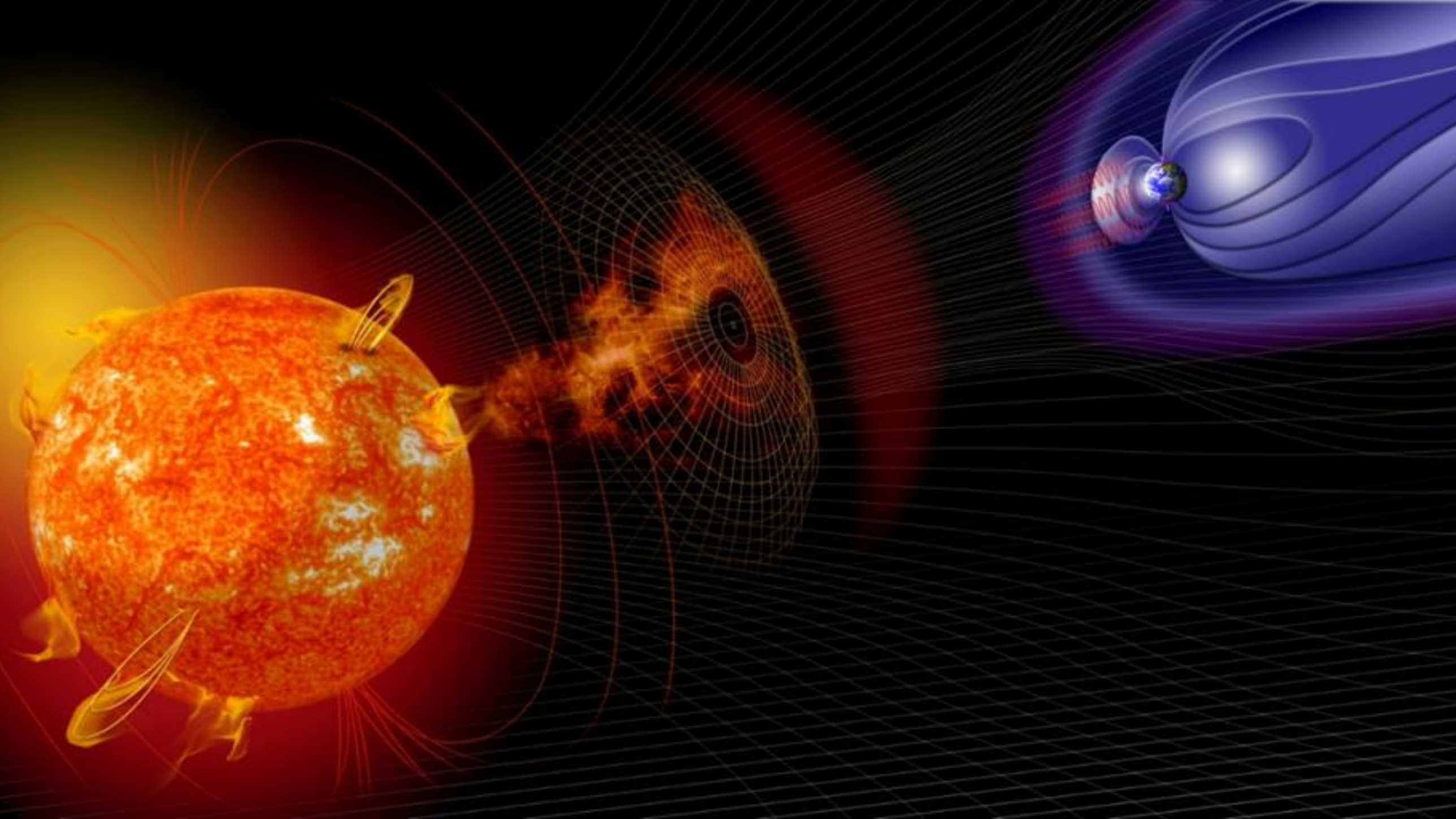


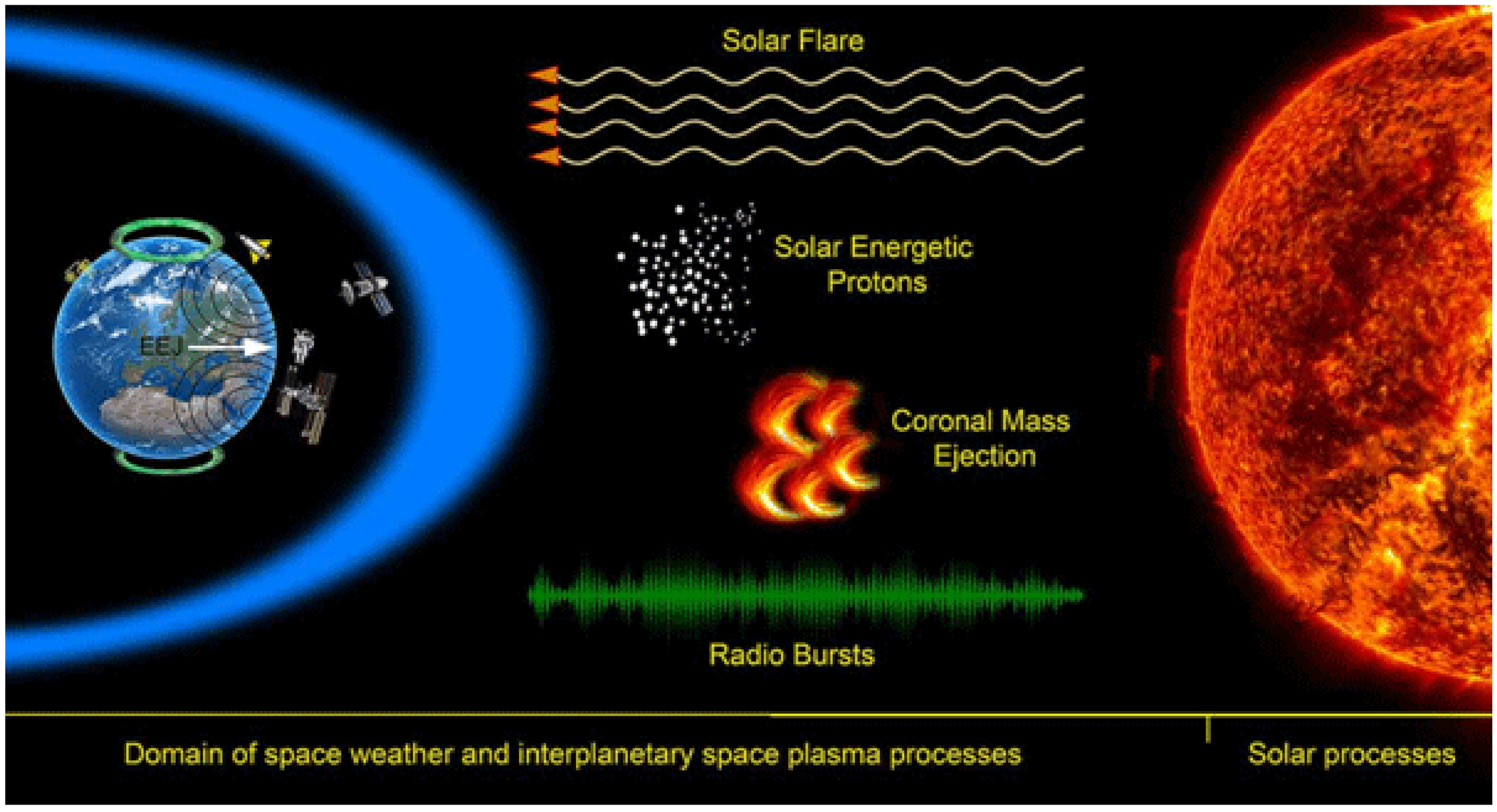
The chance to photograph a solar eclipse occurred in 1860, when he was invited to Spain to observe the total eclipse of the Sun on July 18. The photographs of that phenomenon, here reproduced, have hand annotations written by Secchi, mainly aimed at the marking the position of the observed prominances. Courtesy INAF

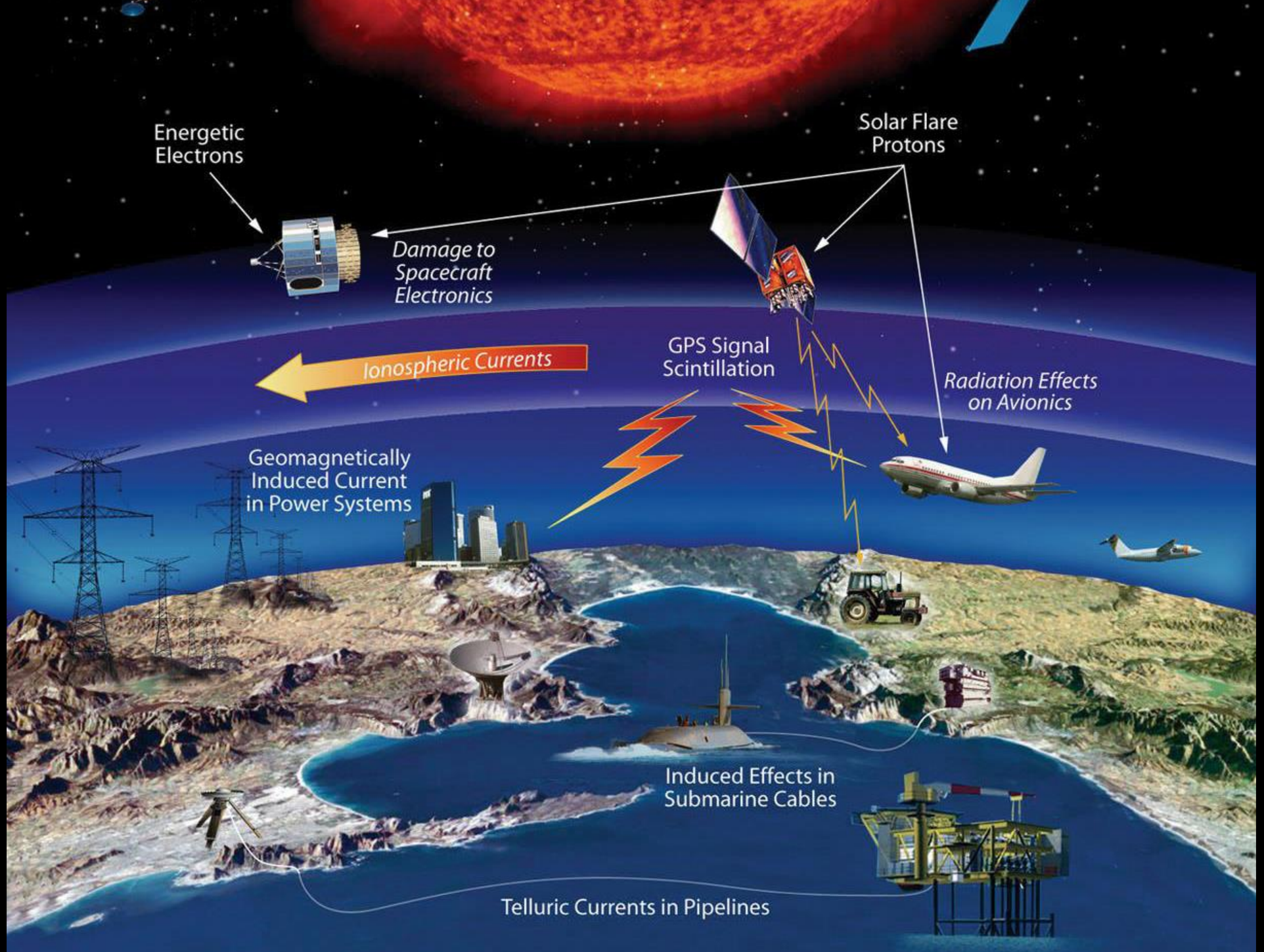
La lezione di Secchi sullo Space Weather

1. Organizzazione
2. Collaborazione
3. Approccio multi-strumento

Per studiare il sole e lo space weather una forte collaborazione è necessaria.




Solar Flare
Solar Energetic Protons
Coronal Mass Ejection
Radio Bursts
EEJ
Domain of space weather and interplanetary space plasma processes
Solar processes


Energetic Electrons
Solar Flare Protons
Damage to Spacecraft Electronics
Ionospheric Currents
GPS Signal Scintillation
Radiation Effects on Avionics
Geomagnetically Induced Current in Power Systems
Induced Effects in Submarine Cables
Telluric Currents in Pipelines

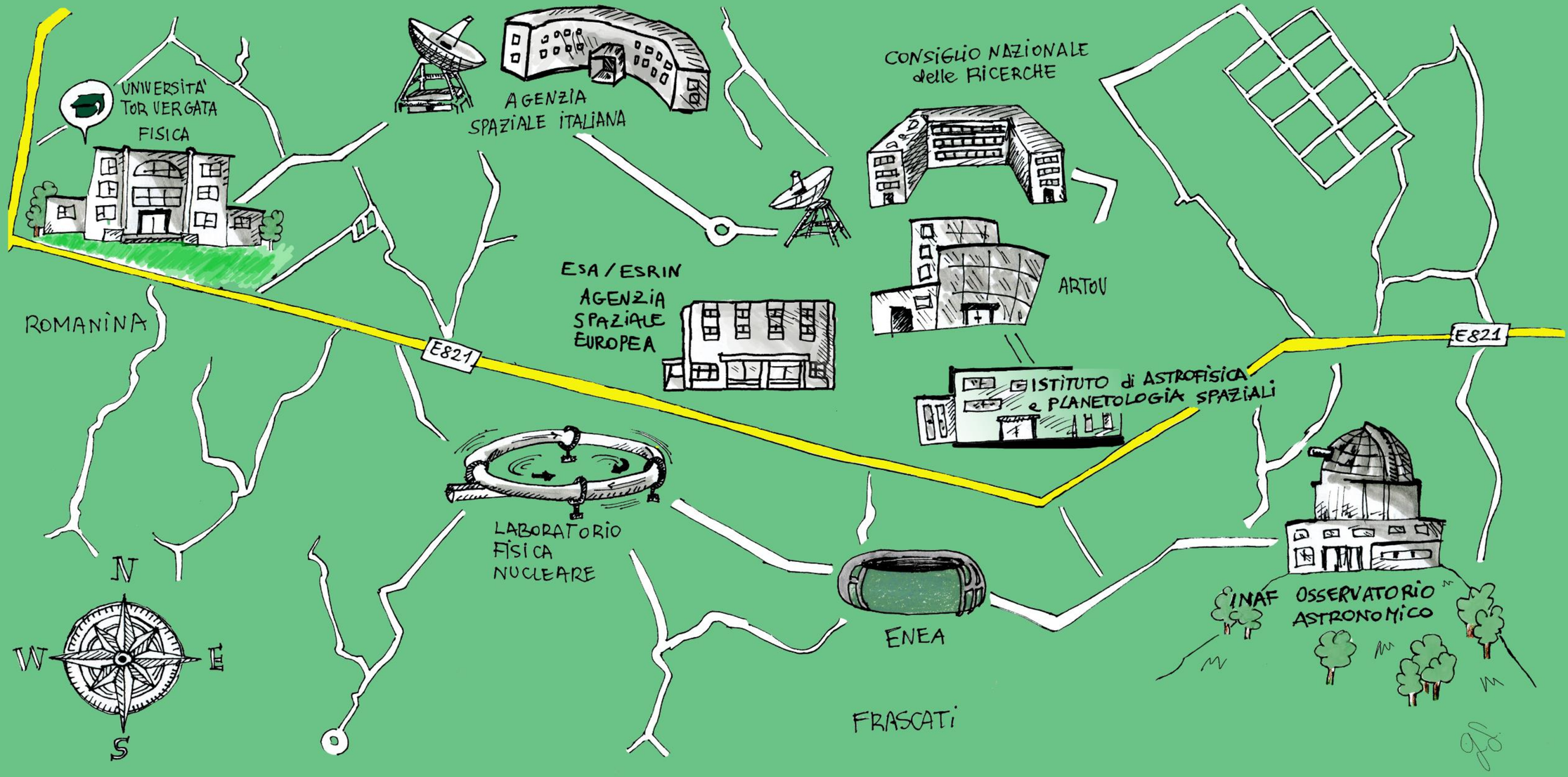
Studiare Fisica ed il Sole a UNITOV

Francesco Berrilli

Dipartimento di Fisica, Università di Roma Tor Vergata
Accademia Nazionale dei Lincei

francesco.berrilli@roma2.infn.it
https://www.fisica.uniroma2.it/~solare/en/

Il Dipartimento di Fisica dell'Università degli Studi di Roma “Tor Vergata” si trova nell'area di ricerca con la maggiore concentrazione di istituti e laboratori scientifici in Italia e tra le prime 20 del mondo



https://www.fisica.uniroma2.it/

fisica.uniroma2.it

Apps | Google Calendar -... | Dizionario Italiano-I... | Totem | Editorial Manager® | Agenzia delle Entra... | Inbox (10,984) - fra... | Francesco Berrilli | loginmiur.cineca.it -... | Google Translate | Solar Physics UToV... | ALBO FORNITORI -... | FlightAware - Tracki...

TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA
Dipartimento di Fisica

Contatti | Elenco Telefonico | Bandi e Avvisi | ENGLISH VERSION | LOG IN

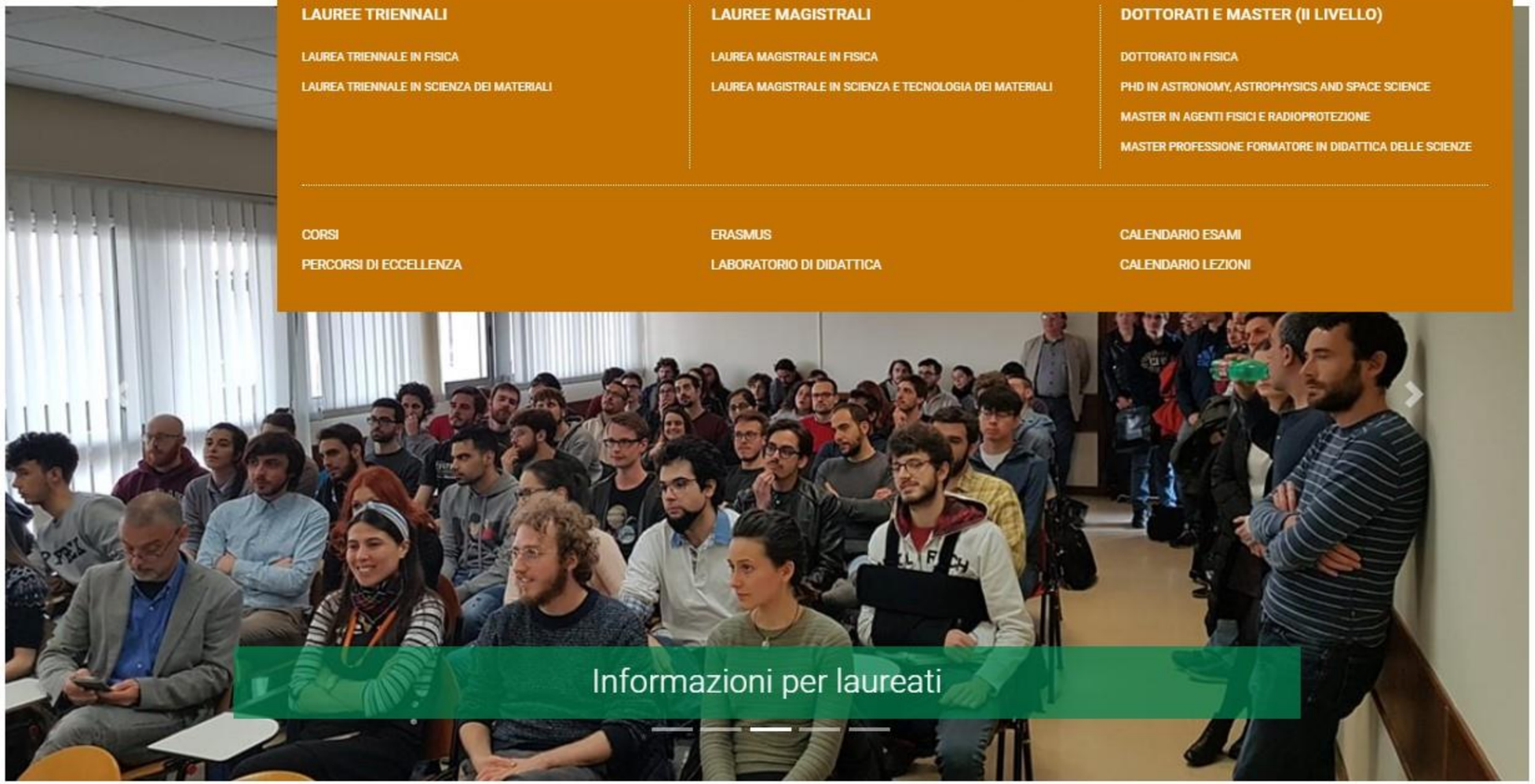
RICERCA | DIDATTICA | SOCIETÀ | DIPARTIMENTO

LAUREE TRIENNALI
- LAUREA TRIENNALE IN FISICA
- LAUREA TRIENNALE IN SCIENZA DEI MATERIALI

LAUREE MAGISTRALI
- LAUREA MAGISTRALE IN FISICA
- LAUREA MAGISTRALE IN SCIENZA E TECNOLOGIA DEI MATERIALI

DOTTORATI E MASTER (II LIVELLO)
- DOTTORATO IN FISICA
- PHD IN ASTRONOMY, ASTROPHYSICS AND SPACE SCIENCE
- MASTER IN AGENTI FISICI E RADIOPROTEZIONE
- MASTER PROFESSIONE FORMATORE IN DIDATTICA DELLE SCIENZE

- CORSI
- PERCORSI DI ECCELLENZA
- ERASMUS
- LABORATORIO DI DIDATTICA
- CALENDARIO ESAMI
- CALENDARIO LEZIONI



Notizie dal Dipartimento

Eventi

10/12/2020 10:00:00
Inaugurazione dell'AA 2020/21
Ms Teams

Bacheca

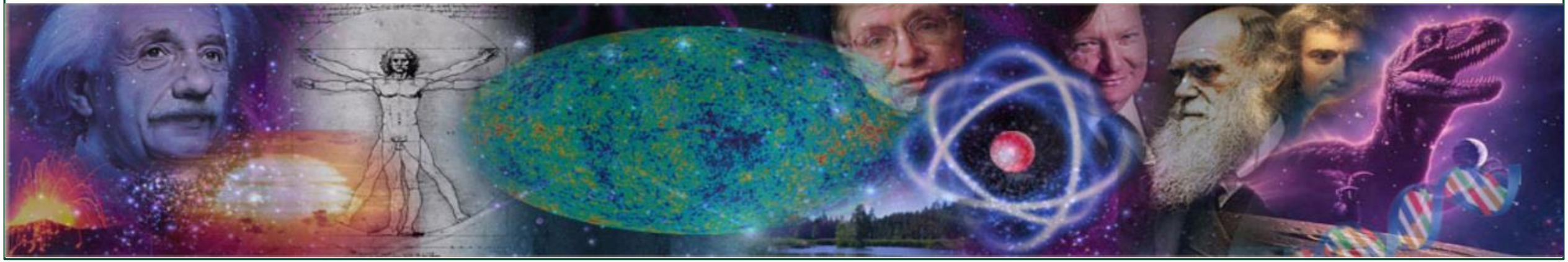
30/11/2020
Newsletter del Dipartimento di Fisica
Giordano Amicucci

Corso di Laurea Triennale in Fisica

Si articola in due curricula:

FISICA

FISICA DELL'ATMOSFERA E METEOROLOGIA



Prelude

The School of Athens, the original name of the fresco actually is *Causarum Cognitio* (Knowledge of Causes), was painted by the 27 year old Raffaello Sanzio.

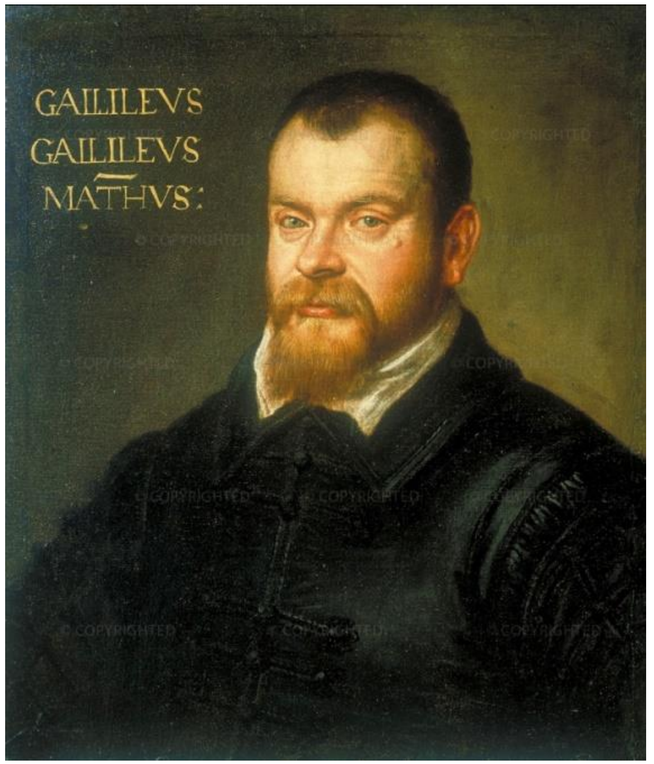
Aristotle held that the Sun, planets, and stars were made of *quintessence*, a pure, perfect substance

Prelude

Replico dunque a V. S. Illustrissima e più resolutamente confermo, che le macchie oscure, le quali col mezo del telescopio si scorgono nel disco solare, non sono altramente lontane dalla superficie di esso, ma gli sono contigue ……. di più, non sono stelle o altri corpi consistenti e di diurna durazione.

So I reply to your Excellency and more resolutely confirm, that the dark spots, which can be seen through the telescope in the solar disk, are not far from the surface of it, but are contiguous ..... moreover, they are not stars or compact bodies of daytime apparence.

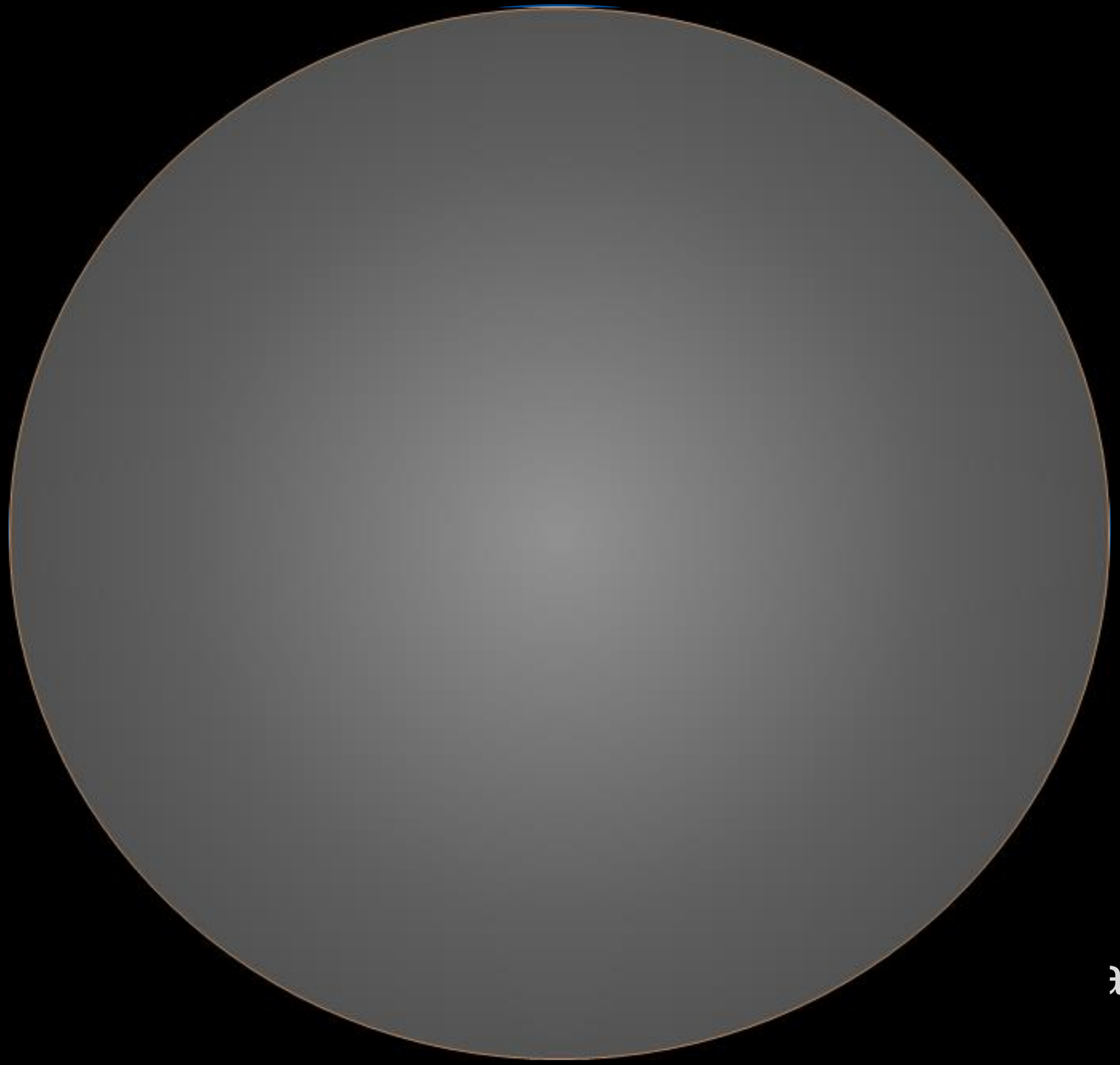
Galileo Galilei - Istoria e dimostrazioni intorno alle macchie solari - Accademia dei Lincei, Roma, 1613



Tintoretto, Portrait of *Galileo Galilei*, National Maritime Museum, Greenwich, 1605-1607

Scheiner, a Jesuit mathematician at the university of Ingolstadt wished to preserve the perfection of the Sun and therefore argued that sunspots were satellites of the Sun.
Galileo demolish his argument, he also criticized Scheiner's *a priori* method of argument: *the Sun is perfect, therefore it cannot have spots on its surface*.

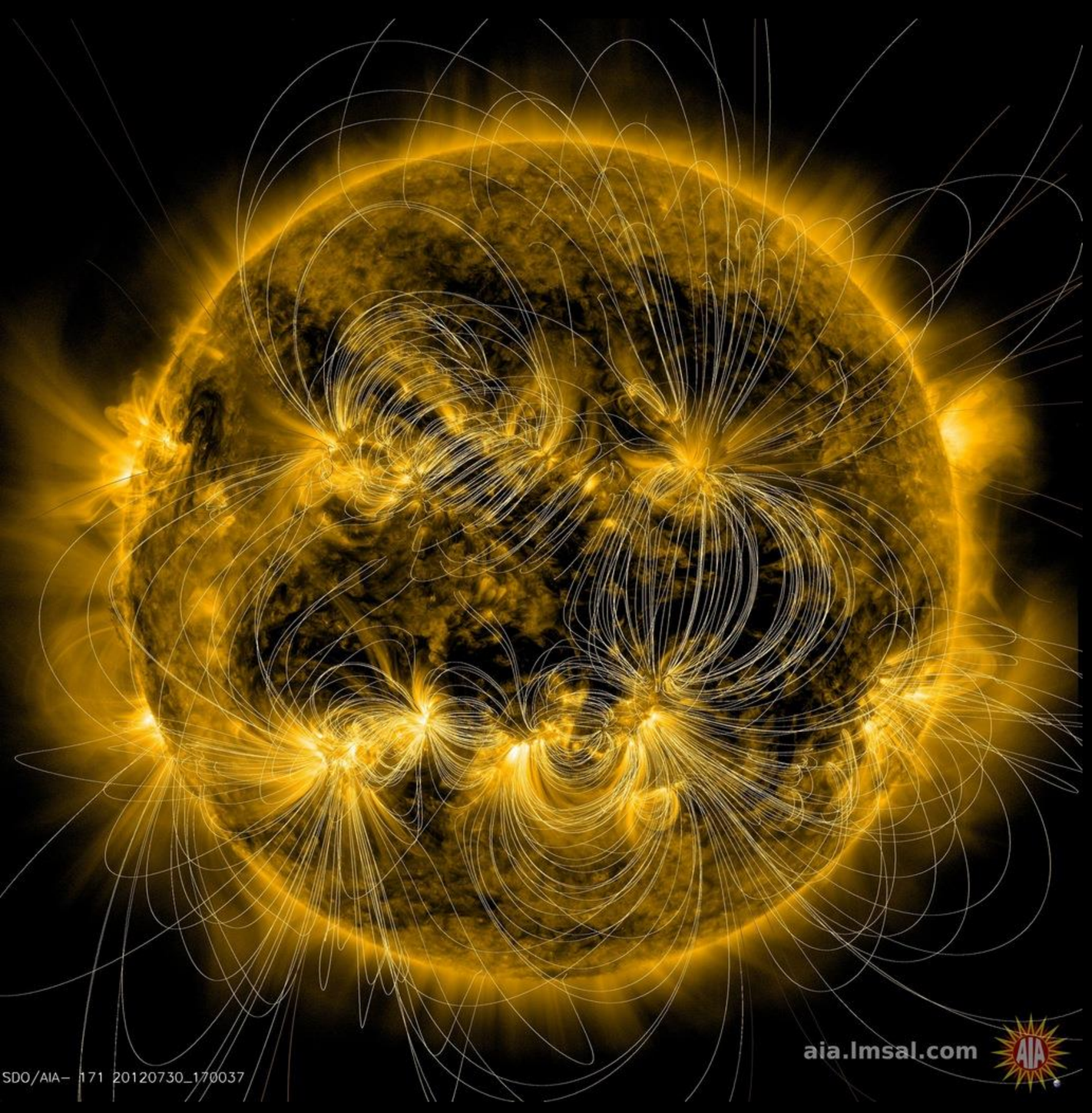
Credits: http://galileo.rice.edu/sci/observations/sunspots.html



The photosphere is a layer of little more that one hundred kilometers thickness where – going inward – the solar gas changes from almost completely transparent to completely opaque.

… most of the information which we have about the Sun steams from this layer.

Credits: The Sun, M. Stix



The photosphere is a layer of little more that one hundred kilometers thickness where – going inward – the solar gas changes from almost completely transparent to completely opaque.

… most of the information which we have about the Sun steams from this layer.

Credits: The Sun, M. Stix

3D star

La lezione di Angelo Secchi

Le misurazioni di precisione dello stato completo di polarizzazione richiedono un grande telescopio.
L'Italia, patria di Galileo e Secchi, che hanno fondato la scienza solare e terrestre, sostiene e partecipa attivamente al progetto European Solar Telescope.

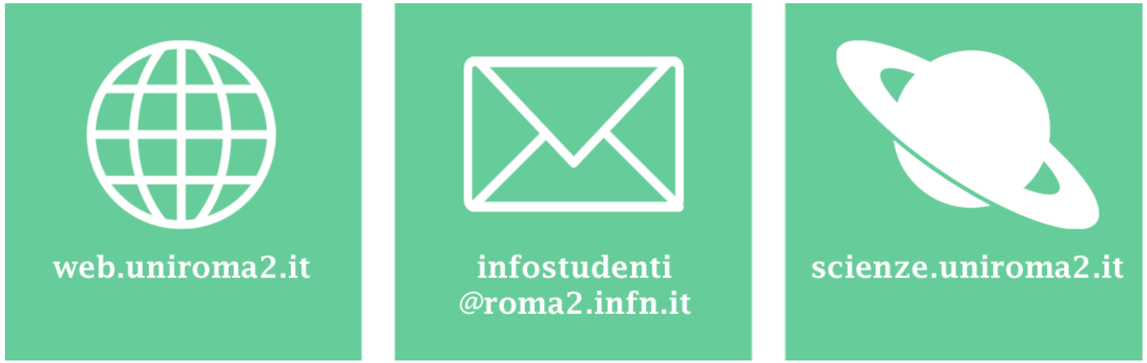
Grazie per l'attenzione!

*Dipartimento di **Fisica** Università di Roma "**Tor Vergata**"*

Via della Ricerca Scientifica, 1

00133 Roma

Contatti:



www.fisica.uniroma2.it