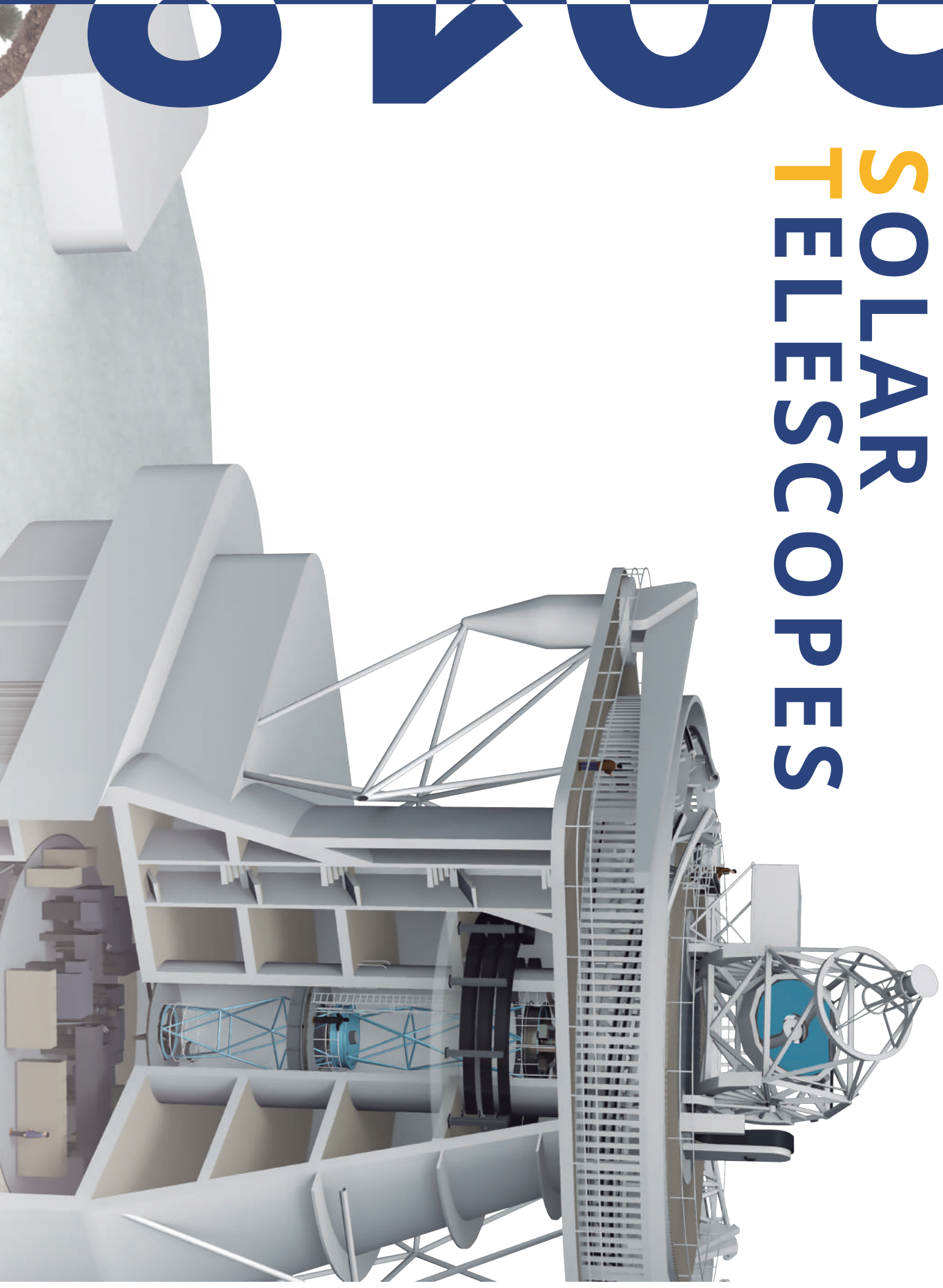


# EUROPEAN SOLAR TELESCOPES

# 2018





Credit: Aleš Kučera (AISAS)

Solar observations at Lomnický Štít Observatory are carried out by the Astronomical Institute of the Slovak Academy of Sciences (Slovakia).

Long-term patrol measurements of the intensity of solar corona in the green iron line (Fe XIV 530.3 nm) have been performed there in order to study variations related to the solar cycle. For that purpose, the coronal index - a new tracer of solar activity - was introduced.

In addition, observations of solar prominences are routinely performed at the observatory. The existing prominence catalogue starts in 1967. Two new polarimeters optimized to observe the solar corona and the chromosphere have recently been installed using structural funds from the European Union.

# JANUARY 2018

MON	TUE	WED	THU	FRI	SAT	SUN
1	2	<b>3</b>	4	5	<b>6</b>	<b>7</b>
8	9	10	<b>11</b>	12	<b>13</b>	<b>14</b>
15	16	17	18	19	<b>20</b>	<b>21</b>
22	23	24	25	26	<b>27</b>	<b>28</b>
29	30	<b>31</b>				

*January 3*

*January 11*

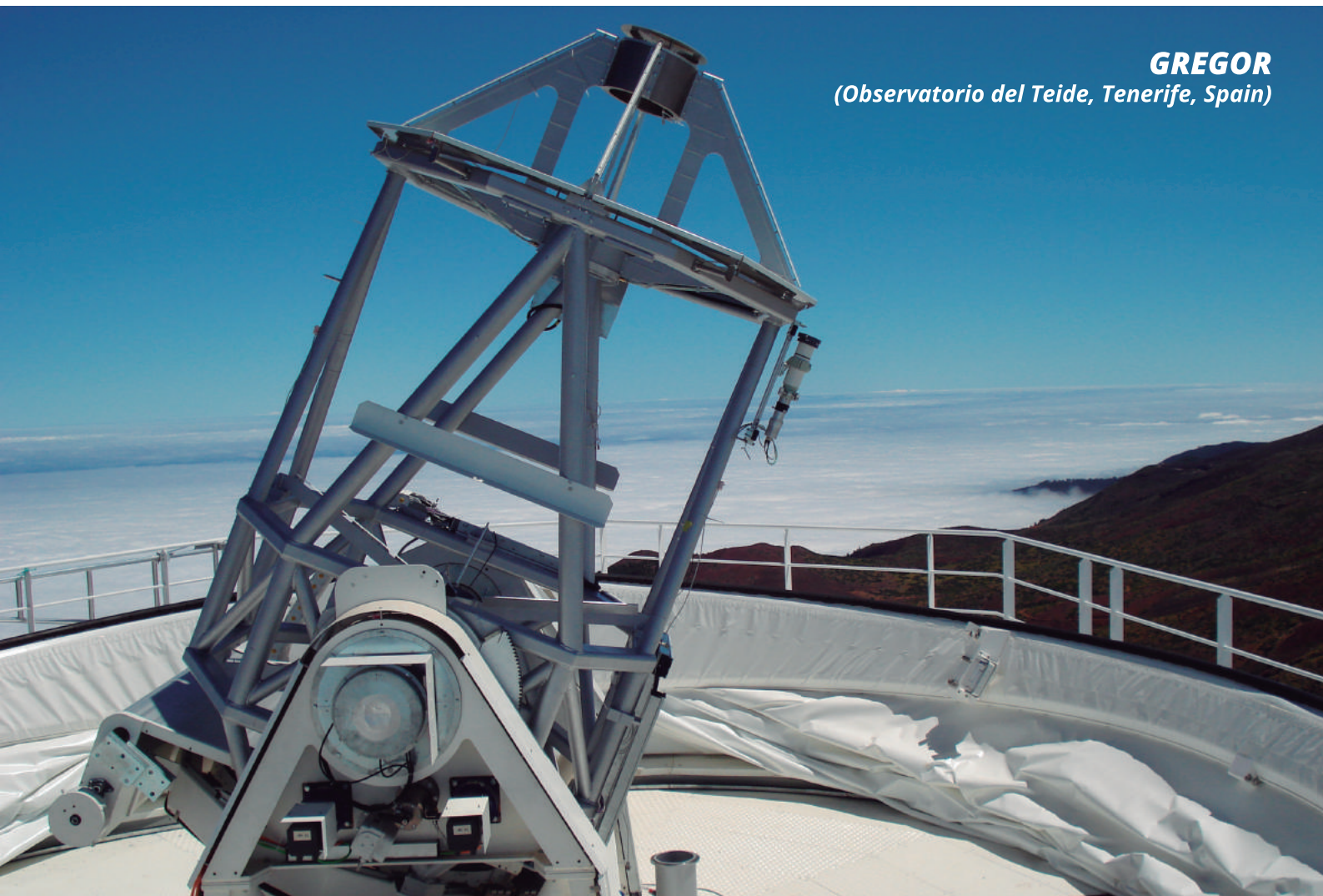
*January 31*

*Peak of Quadrantids meteor shower*

*The UK Missions Forum, Royal Astronomical Society*

*Total lunar eclipse*





Credit: Wolfgang Schmidt (KIS)

**G**REGOR, operated by the Kiepenheuer-Institut für Sonnenphysik, the Leibniz-Institut für Astrophysik Potsdam and the Max-Planck Institut für Sonnensystemforschung (Germany), is Europe's largest solar telescope. It observes the Sun at visible and near-infrared wavelengths to collect data from the photosphere and the overlying chromosphere.

With an aperture of 1.5 meters, GREGOR measures magnetic fields and material motions with high precision and with a spatial resolution of some 50 km on the solar surface. Its excellent polarimetric sensitivity enables the measurement of magnetic field strengths down to a few Gauss.

# FEBRUARY 2018

MON	TUE	WED	THU	FRI	SAT	SUN
			1	2	3	4
5	6	7	8	9	10	11
<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>
19	20	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>
26	27	28				

*February 15*

*Partial solar eclipse*

*February 12 - 16*

*Dynamic Sun II. Solar magnetism from interior to the corona, Siam Reap (Cambodia)*

*February 21 - 23*

*International Association of Geomagnetism and Aeronomy Meeting, Rome (Italy)*

# THEMIS

(Observatorio del Teide, Tenerife, Spain)



Credit: Inés Bonet (IAC)

The **T**hélescope Héliographique pour l'Etude du Magnétisme et des Instabilités Solaires (THEMIS) is a joint venture of CNRS/INSU (France) and INAF (Italy). It is located at Observatorio del Teide in Tenerife, 2400 m above the sea level.

It is a 90 cm aperture solar telescope and currently the fourth largest in the world. Its design allows for high-accuracy spectropolarimetry of the solar surface together with monochromatic high-resolution imaging. The telescope is filled with helium to improve image quality.

## MARCH 2018

MON	TUE	WED	THU	FRI	SAT	SUN
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

March 20

16:15 GMT - Spring equinox

March 26

High Performance Computing meeting, Sheffield (UK)

March 31

Full moon, blue moon (the second full Moon of the month)



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun





**Swedish 1-m Solar Telescope**  
 (Observatorio del Roque de Los Muchachos, La Palma, Spain)

*Credit: Göran Scharmer (Stockholm University)*

The Swedish 1-m Solar Telescope (SST), operated by the Institute for Solar Physics of Stockholm University, is a vacuum telescope with a 1.1 meter lens as its first optical element. When opened in 2002, SST immediately acquired images with a spatial resolution of 0.1 arcseconds – corresponding to 70 km on the Sun. No other telescope had ever shown so small solar details. This was a major leap for observational solar physics.

With outstanding optical quality and unique spectropolarimetric instrumentation, SST observes solar fine structure and magnetic fields at unprecedented spatial resolution and low noise. In 2016 scientists rejoiced over images from a blue-light filter system called CHROMIS, which has opened a new window for exploration of the dynamic and magnetic chromosphere.

# APRIL 2018

MON	TUE	WED	THU	FRI	SAT	SUN
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

*April 3 - 6  
 April 22*

*European Week of Astronomy and Space Science, Liverpool (UK)  
 Peak of Lyrids meteor shower*





**Observatorio del Teide**  
(Tenerife, Spain)



**Observatorio del Roque de los Muchachos**  
(La Palma, Spain)

Credit: Daniel López (IAC) / Pablo Bonet (IAC)

The Observatorio del Teide and the Observatorio del Roque de los Muchachos belong to Instituto de Astrofísica de Canarias (Spain) and combine world-class facilities for night and solar time studies.

At present, there are telescopes and other astronomical instruments from nineteen countries (Armenia, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Taiwan, Ukraine, the United Kingdom, and the United States).

Both observatories form the European Northern Observatory (ENO), an excellent place to observe the Universe. The European Solar Telescope will be built in one of the two observatories starting in 2021.

# MAY 2018

MON	TUE	WED	THU	FRI	SAT	SUN
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

May 6 Peak of Eta Aquarids meteor shower

May 9 Jupiter at opposition



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun



**Kanzelhöhe Observatory**  
(Gerlitzen, Austria)



Credit: Werner Pötzi (Kanzelhöhe Observatory, University of Graz)

The main instrument at Kanzelhöhe Observatory (University of Graz, Austria) bears 4 telescopes on a common equatorial mount: an H-alpha telescope, a white-light telescope, a Ca II K telescope, and a drawing device. In the picture, the observatory is seen from the south.

The small dome in front is for testing new instruments, the dome in the middle was in use until 1973. The open dome in the background houses the patrol instrument - it provides better seeing conditions than the other dome.

The Kanzelhöhe Observatory performs high-cadence, full-disk patrol observations of the sun with a coverage of about 300 observing days a year.

# JUNE 2018

MON	TUE	WED	THU	FRI	SAT	SUN
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

June 21

10:07 GMT - summer solstice

June 25 - 29

IRIS-9, Göttingen (Germany)

June 27

Saturn at opposition





# Gregory Coudé telescope

(Locarno, Switzerland)



Credit: IRSOL

The Gregory Coudé telescope at the Istituto Ricerche Solari Locarno (IRSOL) in Switzerland was constructed by the Observatory of the University of Göttingen, Germany, in the early 1960s. IRSOL was the observation station of the University.

In 1988, IRSOL was taken over by the FIRSOL Foundation. Since 2015 IRSOL is associated with Università della Svizzera Italiana (South Switzerland University). The facility includes a 10 m focal length Czerny Turner spectrograph and is home to the ZIMPOL spectropolarimeter.

# JULY 2018

MON	TUE	WED	THU	FRI	SAT	SUN
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

July 13  
July 27

Partial solar eclipse  
Total lunar eclipse



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun





Credit: Ph. D. Viet

The solar observations performed at the Observatoire du Pic du Midi (France) are done with two different telescopes, the Lunette Jean Rösch and the CLIMSO coronagraph, located on the eastern part of the peak. They are operated by Université de Toulouse.

The Lunette Jean Rösch is used to study the dynamics of the solar surface and the magnetic field by means of a large-field camera (4000x 4000 pixels) and a spectropolarimeter.

The coronagraph is used to study various dynamic phenomena in the solar atmosphere. Both instruments allow to have a global comprehension of the solar activity.

# AUGUST 2018

MON	TUE	WED	THU	FRI	SAT	SUN
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August 11

*Partial solar eclipse*

August 12

*Peak of Perseids meteor shower*

August 20 - 31

*XXXth IAU General Assembly, Vienna (Austria)*



**Einsteinturm**  
(Potsdam, Germany)



Credit: Jürgen Rendtel (AIP)

The Einsteinturm (Leibniz-Institut für Astrophysik Potsdam, Germany) was the first tower solar telescope constructed in Europe in the early 1920s. It was used to detect the gravitational redshift predicted theoretically by Einstein, but with no success. However, the observations led Schröter to propose a two-stream model for the solar granulation.

Measurements of the solar spectrum with the spectrograph of the Einsteinturm led to the development of the Grotrian diagram (a graphical representation of electron transitions in atoms).

The Einsteinturm performed many observations of magnetic fields in sunspots. One of the major findings was the discovery of so-called delta spots (sunspots with opposite polarities inside one penumbra) by Künzle in the 1960s.

# SEPTEMBER 2018

MON	TUE	WED	THU	FRI	SAT	SUN
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

September 10 - 13  
September 23

Hinode 12 Science Meeting, Granada (Spain)  
01:54 GMT - Autumn equinox



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun



# Vacuum Tower Telescope

(Observatorio del Teide, Tenerife)



Credit: Oliver Wiloth (KIS)

The German Vacuum Tower Telescope (VTT) is operated by the Kiepenheuer-Institut für Sonnenphysik (KIS) in cooperation with the Leibniz-Institut für Astrophysik Potsdam (AIP) and the Max-Planck Institute für Sonnensystemforschung (MPS).

It is a classical solar telescope: two coelostat mirrors feed the sunlight into the telescope. The primary mirror has a diameter of 70 cm and a focal length of 46 m. The telescope is inside a building with a height of some 38 m spanning more than 10 floors.

The VTT offers several large optical laboratories for all kinds of permanent and temporary optical setups.

## OCTOBER 2018

MON	TUE	WED	THU	FRI	SAT	SUN
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

October 9

October 10

October 21

Peak of Draconids meteor shower

Peak of Southern Taurids meteor shower

Peak of Orionids meteor shower



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun





Credit: Osservatorio Astronomico di Roma

**T**ill recent times Monte Mario was one among the three sites of the Osservatorio Astronomico di Roma (Italy), while it hosts now Istituto Nazionale di Astrofisica (INAF) headquarters, with the presidency and central administrative offices of the institute.

The Monte Mario site includes the beautiful Villa Mellini (XV century) with the Museo Copernicano, the solar tower, and the turret of the Rome meridian, the Italian first meridian.

The picture shows a view of the Villa and town of Rome from the solar tower top.

# NOVEMBER 2018

MON	TUE	WED	THU	FRI	SAT	SUN
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

November 12  
November 17

Peak of Northern Taurids meteor shower  
Peak of Leonids meteor shower



# European Solar Telescope

(Canary Islands, Spain)



Credit: Gabriel Pérez (IAC)

**E**ST, the European Solar Telescope, is a revolutionary 4-metre-aperture telescope designed to investigate our active Sun at unprecedented resolution.

Equipped with state-of-the-art instrumentation, it will help scientists understand the magnetic coupling of the solar atmosphere. EST will be installed in the Canary Islands (Spain) to benefit from unique observing conditions. First light is planned for 2027.

EST is promoted by the European Association for Solar Telescopes (EAST), with 23 participating institutions from 15 European countries.

## DECEMBER 2018

MON	TUE	WED	THU	FRI	SAT	SUN
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

December 14  
December 21

Peak of Geminids meteor shower  
22:23 GMT - Winter solstice



The European Solar Telescope (EST) is the next step in the European quest for a better understanding of the sun

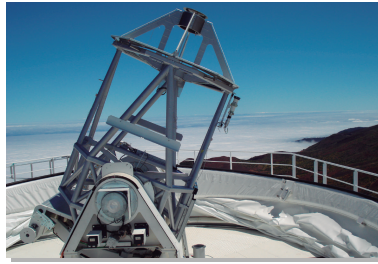


## JANUARY



**Lomnický štít Observatory**  
(High Tatras, Slovakia)

## FEBRUARY



**GREGOR**  
(Observatorio del Teide, Tenerife, Spain)

## MARCH



**THEMIS**  
(Observatorio del Teide, Tenerife, Spain)

## APRIL



**Swedish 1-m Solar Telescope**  
(Observatorio del Roque de Los Muchachos, La Palma, Spain)

## MAY



**Observatorio del Teide**  
(Tenerife, Spain)  
**Observatorio del Roque de los Muchachos**  
(La Palma, Spain)

## JUNE



**Kanzelhöhe Observatory**  
(Gerlitz, Austria)

## JULY



**Gregory Coudé telescope**  
(Locarno, Switzerland)

## AUGUST



**Lunette Jean Rösch and CLIMSO coronagraph**  
(Observatoire du Pic du Midi, France)

## SEPTEMBER



**Einsteinium**  
(Potsdam, Germany)

## OCTOBER



**Vacuum Tower Telescope**  
(Observatorio del Teide, Tenerife)

## NOVEMBER



**Osservatorio Astronomico**  
(Roma, Italy)

## DECEMBER



**European Solar Telescope**  
(Canary Islands, Spain)







[www.est-east.eu](http://www.est-east.eu)



European  
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