SISSA

Scuola Internazionale Superiore di Studi Avanzati

PRESS RELEASE

Simons Observatory's Large Aperture Telescope Achieves First Light: A New Window on the Early Universe

With its mirrors now in place and first light achieved, the LAT begins its mission to probe the cosmos — with SISSA playing a key role in data analysis.

Trieste, 27 March 2025

The Simons Observatory (SO), a most advanced network of telescopes aimed at mapping the Cosmic Microwave Background (CMB) with unprecedented precision, has reached a major milestone: the Large Aperture Telescope (LAT) has achieved first light. This marks the full deployment of the observatory, beginning of a new era of cosmological observations that could unveil fundamental aspects of the early Universe, aiming at the detection of cosmological Gravitational Waves from the very first moment after the Big Bang.

The SO, supported primarily by the Simons Foundation and the Heising-Simons Foundations, with participation from the National Science Foundation and several Institutions across four continents, is located in the Atacama Desert in Chile, and is constituted by a combination of Large and Small Aperture Telescopes, whose

SISSA
Scuola Internazionale Superiore di Studi Avanzati

data are collected, reduced, analyzed and interpreted by a global community of instrumentalists, data analyzers, theorists. It is measuring temperature and polarization anisotropies in the CMB with unprecedented sensitivity, enabling the most precise constraints on Early Universe physics, neutrino masses, dark matter and energy interactions.

SISSA has been the first SO Member Institution in Italy, and plays a crucial role in the SO, leading the Theory and Analysis Committee (TAC). Under the chairship of Prof. Nicoletta Krachmalnicoff, the TAC provides guidance to the collaboration in terms of scientific strategy, ensuring that SO's data analysis and theoretical models maximize the impact of the experiment.
"The first light of the Large Aperture Telescope is a most important achievement for Simons Observatory. It marks the beginning of the operations by the complete facility, complementing the ongoing observations of the Small Aperture Telescopes, in progress since about 6 months: with SO's data, and through the combination of LAT and SATs, we aim to unlock some of the deepest cosmic mysteries, from the physics of inflation to the very nature of dark matter and dark energy," says Prof. Nicoletta Krachmalnicoff, Chair of the Theory and Analysis Committee at Simons Observatory.

What comes next? With SO fully operational, the coming years will be dedicated to data acquisition and optimization of analysis techniques, probing cosmological GWs as well as the Dark Cosmological Components through cross-correlations with large-scale structure surveys. "Under the guidance of Prof. Krachmalnicoff, SISSA is at the forefront of these investigations, destined to have a profound impact on the major unknowns in cosmology and fundamental physics", Carlo Baccigalupi, APC PhD Coordinator and Member of the SO Collaboration Board, explains. The full deployment of the SO marks a turning point in observational cosmology, providing an unprecedented dataset that will shape our understanding of the Universe for years to come.

USEFUL LINKS
LAT First Light

IMAGE:
Credits:
Simons Observatory

SISSA
Scuola Internazionale
Superiore di Studi Avanzati
Via Bonomea 265, Trieste
W www.sissa.it

Facebook, Twitter
@SISSAschool

CONTATTI
Nico Pitrelli
M pitrelli@sissa.it
T +39 3391337950

Alessandro Tavecchio
M tavecchio@sissa.it
T +39 3341468174