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The Large Observatory For x-ray Timing (LOFT) is a mission concept designed to study the behavior of matter under the most extreme effects of gravity (strong field regime), where the effects predicted by General Relativity are expected to dominate the dynamics of matter, and in the densest environments such as the interior of neutron stars, where the density reaches super-nuclear values and still unknown states of matter may form. LOFT is designed to verify the predictions of General Relativity and to determine the equation of state of ultra-dense matter by measuring the spectral-timing properties of the X-rays originated in the innermost regions around stellar-mass and supermassive black holes as well as neutron stars. In addition to this “Core Science”, 40% of the observing time is foreseen to be devoted to “Observatory Science”.

The instrumentation is composed of a Large Area Detector - a 8 m² collimated instrument operating in the 2-30 keV energy range with 200 eV spectral resolution and a Wide Field Monitor a 5-sr field of view imager with arcmin angular resolution in 2-50 keV. The mission was originally studied by the European Space Agency as candidate M3 mission within the Cosmic Vision programme and it has been recently repropose for the M4 launch slot in 2025.

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