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Magnetic noise mitigation for upcoming Gravitational Waves detectors

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Gravitational waves are distortions of spacetime generated by extremely violent astrophysical events, as predicted by Albert Einstein's General Theory of Relativity. In 2015, groundbreaking technologies in gravitational wave detectors (GW) opened a new window for observing the universe, marking the beginning of the GW era. Building on the success of the second-generation detectors, Advanced LIGO and Advanced VIRGO, the "Einstein Telescope" (ET) will be a third-generation GW detector. Its entire structure will be constructed underground at depths of 100 to 300 meters to shield it from vibrations caused by both seismic activity and human activity, which contribute to what is known as "noise." ET will incorporate cutting-edge technologies in a multi-interferometer configuration, allowing it to observe a volume of the universe approximately a thousand times greater than its predecessors, with the goal of exploring the entire universe through gravitational waves. ET will have enhanced sensitivity compared to current interferometers. To achieve these targets at low frequencies (a few Hz to around 100 Hz), we are developing magnetic noise mitigation strategies, which will be explained in the presentation.

Primary experiment

Einstein Telescope

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