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The ALPS II Optical System

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The Any Light Particle Search II (ALPS II) is a ‘light-shining-through-a-wall’ experiment currently running at DESY in Hamburg, Germany, searching for axions and axion-like particles. ‘light-shining-through-a-wall’ experiments use a strong laser to shine light through a strong magnetic field to convert a fraction of the light into axions. The unconverted light is blocked by a wall while the axions pass through. A fraction of the axions are then reconverted to photons within another magnetic field and are measured on the other side of the wall, thus confirming a conversion-reconversion process has occurred. On site, the experiment employs a high-power laser system, a 230 m long magnet string consisting of 24 HERA dipole magnets, a complex optical system including a 122 m long high finesse cavity, and a detector system with capabilities to measure ultra-weak signals on the order of photons per day after the wall. After a successful first science run, the experiment is currently in an upgrading phase. This upgrade includes the commissioning of a second high finesse cavity as well as upgrades to the optical system to suppress background signals. This talk will give an overview of the optical system, report on the current status of the upgrade commissioning, as well as give an outlook on the experiment.

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