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| Autore | Polini Eleonora |
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| Disciplina | 530.1 |
| Soggetti | Gravitation<br>Quantum optics<br>Astrophysics<br>Optoelectronic devices<br>Gravitational Physics<br>Quantum Optics<br>Optoelectronic Devices |
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| Nota di contenuto | Gravitational waves -- Ground based gravitational waves detectors -- Theory of quantum light in gravitational waves detectors -- Quantum noise reduction system overview in Advanced Virgo Plus -- Quantum noise reduction system commissioning -- Stray light in gravitational waves detectors -- Ghost beams study and mitigation -- Active control of scattered light on the FDS system -- Matching of the squeezing beam to the ITF -- New high finesse Output Mode Cleaner for Advanced Virgo Plus. |
| Sommario/riassunto | This book presents the first implementation of frequency-dependent squeezing in the Virgo gravitational wave detector, a technique that reduces quantum noise across the entire detection band. By lowering noise, it enhances Virgo’s ability to observe the universe. It provides a detailed account of the experimental optical system—spanning hundreds of meters—and the measurement campaign that led to the first observation of frequency-dependent squeezing, with ellipse |

rotation occurring at the target frequency of a few tens of Hz. Additionally, the book covers the characterization and commissioning of a new Output Mode Cleaner cavity in Virgo to minimize optical losses on squeezed states. Finally, it examines the impact of stray light noise at low frequencies and explores mitigation strategies to improve detector sensitivity.