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Advanced Optics Lab @ Tor Vergata for ET (AiLoV-ET)

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The AiLoV-ET project seeks to advance optical systems to enhance the performance and quality of the Einstein Telescope (ET) optics. Two primary challenges impacting interferometer sensitivity are high-reflectivity coatings, contributing to thermal noise, and optical aberrations, affecting high-power operation essential for reducing quantum noise. The laboratory at the University of Roma Tor Vergata will explore innovative technologies, particularly in the framework of advanced materials, wave-front sensing, and cryogenic studies. The Aberration control aspect focuses on developing techniques to mitigate optical distortions, by testing new actuators and wave-front sensors and correlating their operation with control and alignment signals. Coatings research emphasizes innovative materials for ET mirror reflective coatings, requiring high optical performance and low mechanical dissipation at both room and cryogenic temperatures. De-icing methods for cryogenic test masses are developed to address frost accumulation, which reduces mirror reflectivity and interferometer stability.
The renovation and adaptation of the infrastructure are presented together with the experimental set up that will be included.

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