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# Noise Study for ET's Cryoarea

The Einstein Telescope (ET), a next-generation underground gravitational-wave observatory, aims to extend sensitivity to lower frequencies through cryogenic cooling of its main optics. A critical challenge in this design is the cryoarea, where baffles must operate under extreme cryogenic conditions that alter material, thermal, optical, and vibrational properties. Building on previous studies that used ProVac3D simulations to optimize baffle placement and minimize residual gas pressure, we evaluated the resulting noise contributions from backscattering and diffraction using SIS simulations. Our results show that noise levels in the cryoarea are comparable to those along the interferometer arms, with diffraction dominating in the arms and backscattering prevailing near the cryoarea.

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