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## The Einstein Telescope Pathfinder and its Vacuum System

The Einstein Telescope (ET) will be the next generation gravitational wave observatory in Europe with a sensitivity reaching beyond the CMB into the dark era of the Universe. Each corner of the triangular baseline design is the center of two interferometers with 10 km long arms, one operated at room temperature, the other one with mirrors at cryogenic temperatures of 10 –15 K that reduce the noise contribution at frequencies as low as 3 Hz.

The ET-Pathfinder (ET-PF) project at Maastricht University is a R&D facility for the challenging cryogenic interferometer technology of ET. It is a 20 m x 20 m interferometer with six towers that will house the seismically decoupled cryogenic Si-mirrors, laser systems and detectors. The KIT group developed the control system of the ultra-high vacuum system for ET-PF, based on the expertise from the KATRIN neutrino experiment. In addition, a test facility is currently being set up at KIT to investigate adsorption and desorption processes of residual gas on the cryogenic mirror surfaces, as well as monitoring techniques and in-situ cleaning procedures. This paper presents the objectives and status of these activities and their contribution towards the next generation gravitational wave observatory.

### Collaboration(s)

Einstein Telescope Pathfinder (ET-PF)

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