

Alternative Concepts for the Ultra-High Vacuum Tubes

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The Einstein Telescope requires about 120 km of vacuum tubes with a diameter of 1 m to achieve the design sensitivity and reduce scattered light.

The pressure inside the tubes needs to be below 10^{-11} mbar to minimize the residual gas noise.

The current baseline concept of the vacuum system foresees passive sections welded together from stainless steel and connected to pumping stations.

Achieving ultra-high vacuum (UHV) in these tubes requires high pumping capacities and long bake-out times of the tubes, which is associated with high energy and equipment costs.

This poster discusses different improvements over the baseline design, like integrating getter surfaces into the inside of the tubes promising a cheaper and more homogeneous distribution of pumping power.

Furthermore, we will give an overview of the development and establishment of laser beam welding under vacuum as a new technology to produce UHV as it requires less effort to rework the weld seams.

Forming the flanges of the pipe material itself to ensure a seamless flange connection is another concept that is present in this poster.

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