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A high performance piston pump for ultra-clean noble gas experiments

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In many rare event searches noble gases are used as detector target. In order to achieve high sensitivities, the target material needs to be continuously circulated and cleaned from impurities and radioactive contaminants. To pump and compress xenon gas through such systems an ultra-clean, hermetically sealed, radon-free pump without oil lubrication is indispensable. Taking into account the increasing target masses of these low background experiments, higher purification fluxes are necessary and multiple parallel pumps may be required. For such purposes and especially for a radon removal system for XENONnT, a four cylinder magnetically-coupled pump was developed to ensure high cleanliness and stable operation.

This poster will show the basic idea of the piston pump and give an overview of the archived high-performance.
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