



Design of Hydrostatic Level System at APSU Storage Ring

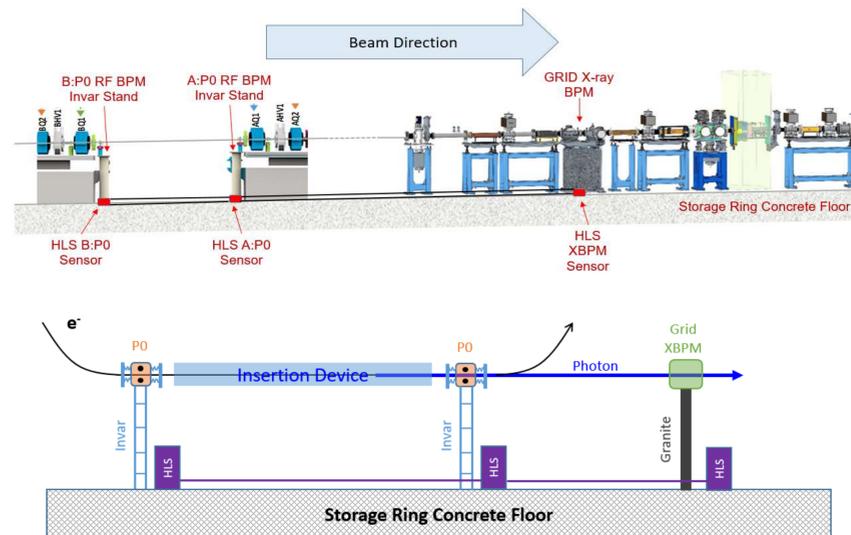
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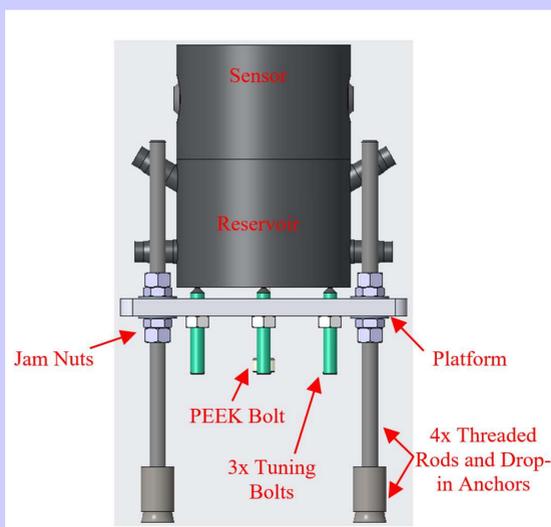
Abstract

A Hydrostatic Leveling System (HLS) has been designed for the Advanced Photon Source Upgrade (APS-U) storage ring (SR) to characterize the relative floor motion along each Insertion Device Front End (IDFE) and the global floor motion of the SR tunnel. 3 HLS sensors will be installed alongside each IDFE. Two sensors will be mounted near the ID Beam Position Monitors (BPMs), which are located at either end of the ID. The 3rd HLS sensor will be mounted near the Grazing-Incidence Insertion Device X-Ray BPM (GRID xBPM), about 20 meters away from the source point. In addition, there will be 1 sensor installed in each of the 5 sectors in Zone-F where there are no ID beamlines. The HLS water network along each of the 35 IDFEs and 5 sectors in Zone-F are connected via valves to form a global network around the 1.1 km SR tunnel. The HLS will measure the vertical floor displacement at a total of 110 locations. Combined with the highly stable BPM/xBPM stands, the HLS can better characterize the electron and photon beam long-term stability. The HLS design is based on a two-pipe system for easy installation in tight spaces. In this paper, we present the design of the HLS system and preliminary performance of the first article units.

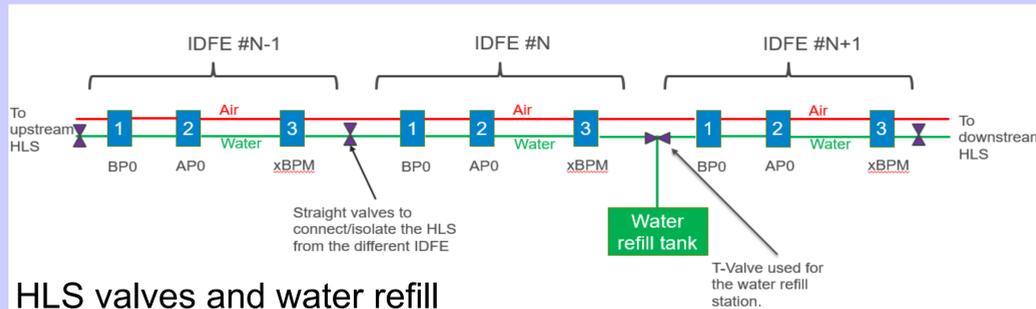
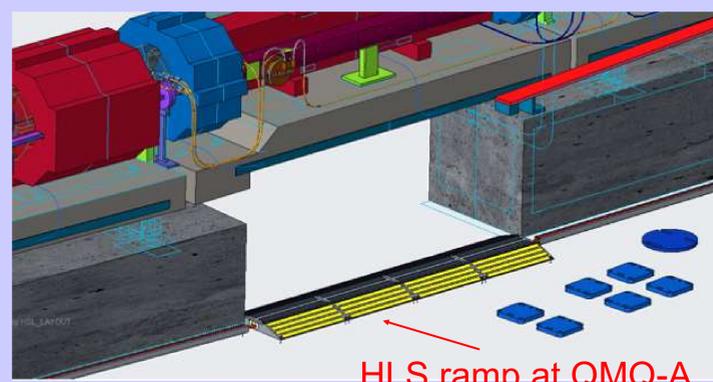
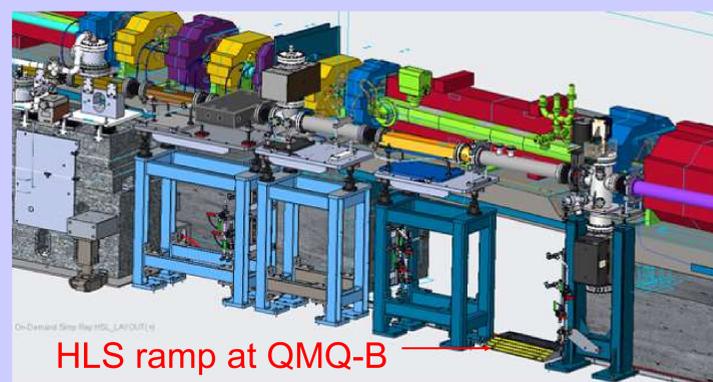
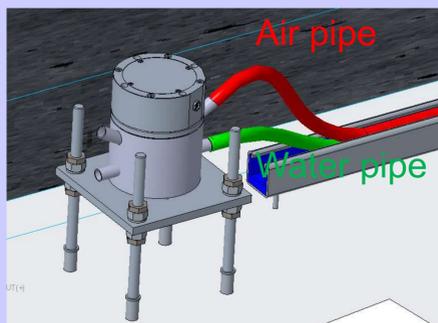


Hydrostatic Leveling System (HLS) for one of the APSU ID beamline front end.

HLS Mechanical Design

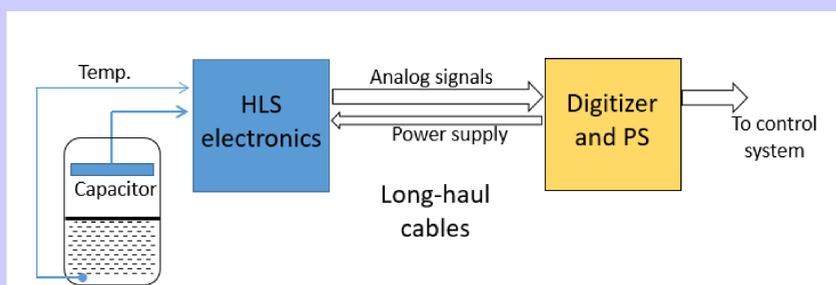


HLS sensor/reservoir and its stand



HLS valves and water refill

HLS Electronics Design



(top) HLS electronics schematics

(right) HLS cable routing for a double sectors

