BUILDING THE WORLD'S LARGEST COMPLEX VACUUM SYSTEM (ITER) CHALLENGES AND ACHIEVEMENTS.

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ITER is under construction in the south of France in order to demonstrate the feasibility of fusion as a clean power source. It is one of the world's largest scientific and engineering collaborations. The civil structures have progressed, allowing the start of installation of very large vacuum vessels, in-vacuum components and vacuum piping networks.

The ITER vacuum system will consist of a number of large volume vessel systems including the Cryostat (~ 8500 m^3), the Torus (~1330 m^3), the Neutral Beam injectors (~180 m^3 each) and a large number of lower volume systems. The Vacuum System forms an integral part of the Fusion Fuel Cycle, streaming all gas originating or injected into the tokamak, through the Roughing Pumping System, to the other Tritium Plant processing systems.

The design of the Vacuum Systems is particularly driven by ITER's fusion power operational phases, where gas streams dominated by hydrogen isotopes will be pumped in a magnetic and ionizing radiation environment. More than 90% of the vacuum system will however be installed and operational for the First Plasma phase.

The construction of the ITER machine is advancing whilst completing civil works. This gives many challenges for a UHV systems particularly in the area of vacuum cleanliness and for ensuring vacuum leak tightness.

The paper will show spectacular progress in the construction of ITER and number of achievements in the design, qualification and manufacturing of fusion relevant vacuum components.