Abstract Submitted
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Design and operation of a novel divertor cryopumping system in Alcator C-Mod[1] B. LABOMBARD, B. BECK, J. BOSCO, R. CHILDS, D. GWINN, J. IRBY, R. LECCACORVI, S. MARAZITA, N. MUCIC, S. PIERSON, Y. ROKHMAN, P. TITUS, R. VIEIRA, J. ZAKS, A. ZHUKOVSKY, MIT Plasma Science and Fusion Center — C-Mod's recently installed upper-divertor cryopump is unique among the world's tokamaks, employing an array of gas-pumping slots that penetrate the upper divertor target. This geometry enables the use of a single toroidal loop of liquid helium, operating in an efficient heat transfer regime with low or no helium flow. A system pumping speed of 9,600 l/sec for D_2 gas has been achieved, matching that of a full-scale prototype system. Neutral pressures in the pumping slots during upper-null plasmas (USN) are found to meet or exceed pressures in the lower divertor's private flux region during lower-null (LSN) – evidence that the pumping-slot geometry is performing as intended. Very high steady-state pumping throughputs (exceeding ∼140 torr-l/s) have been demonstrated in USN. Reliable and efficient operation of the pump has been established, synchronized with the C-Mod shot cycle and consuming 60 to 90 liters of liquid helium during a full day of operation.

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