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Compact getter pump with arc evaporator of Titanium

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Liquid helium cryopumps are among the most efficient high vacuum pumps used in controlled thermonuclear fusion experiments. Cryopumps can provide exceptionally high pumping capacity for hydrogen/deuterium at high pumping speed, but have limitations on the heat load. From the other side, growing average power of the fusion experiments demands high speed pumps capable to withstand high heat load. For this type of applications, cryosorption (or getter) pumps attract more and more attention. Usually, a layer of Titanium sputtered over a cryopanel cooled by liquid nitrogen serves as a sorption surface in this type of pumps. This paper describes design of a compact getter pump based on U-shaped cell made of ribbed aluminum and equipped with arc evaporator of Titanium. Pumping properties of the pump are measured in the temperature range of 80 –300K for both hydrogen and deuterium. Optimal modes of titanium films deposition are studied for a range of the gas load. Calculations of the sorption properties of the pumping cell are conducted based on an original method, which allows to consider directional molecular flows in the measuring volume.

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