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P4.021 Commissioning of vacuum pumping system for the second KSTAR neutral beam injection system

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To achieve the high performance plasma in the Korea Superconducing Tokamak Advanced Research (KSTAR) tokamak, Neutral Beam Injection (NBI) system has been installed. The first NBI (NBI-1) was installed in 2010, which provides a 100 keV deuterium neutral beam of 5.5 MW maximum using three ion sources. The second NBI (NBI-2) with another 6.0 MW will be constructed until 2019. In this process, one ion source will be used to improve the plasma performance at 2018 KSTAR campaign. As the vacuum condition can have substantial effect on the beam performance, the vacuum pumping system for NBI-2 has been carefully designed. The cryopumps for NBI-2 were designed and the overall vacuum pumping system of NBI-2 was installed including turbo pumps, mechanical booster pumps, and dry pumps. In this paper, the detailed engineering design, fabrication and installation results of large condensation cryopump and vacuum sub-components were explained. The effective pumping speed and pressure distribution will be evaluated through the commissioning of vacuum pumping system for NBI-2. Finally, we plan to establish the operation procedures of the vacuum pumping system.

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