

Abstract Submitted  
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**VFT design and multi-pactor analysis for high power helicon current drive system in KSTAR**<sup>1</sup> KWANGHO JANG, SONJONG WANG, HYUNHO WI, National Fusion Research Institute (NFRI), KENJI SAITO, National Institute for Fusion Science (NIFS), HYUNGYONG LEE, JEEHYUN KIM, JONGGU KWAK, National Fusion Research Institute (NFRI) — A helicon wave was confirmed to be coupled at low power and a high power coupling has been tried in KSTAR. When the RF is applied to the antenna system, the reflected power gradually increases by the timescale of sub-milliseconds. Rather slower process than usual arcing suggests that the reflection is caused by a multi-pactor discharge. In order to apply a high power helicon wave to the tokamak plasmas, it is important to mitigate or eliminate the multi-pactor discharge. A new VFT is fabricated following the design which focuses on the reduced total RF electric field and zero axial electric field on the TiN coated alumina surface. The disc type alumina window does not protrude in to the coaxial conductors so as to eliminate axial electric field. The unmatched impedance caused by the 1 cm thick alumina is compensated by the series matching element positioned in the pressurized section. For further understanding multi-pactor discharge at the helicon antenna system the multi-pactor test chamber (MTC) was developed. The high electric field is generated by the series unmatching structures at the both sides of sample holder. The MTC is mainly used to evaluate multi-pactor avoiding technique and to develop conditioning processes.

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