

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Preliminary Design of the Alfvén Antennas on the J-TEXT Tokamak JIYANG HE, QIMING HU¹, BO RAO, LINZI LIU, GE ZHUANG, State Key Laboratory of Advanced Electromagnetic Engineering and Technology, Huazhong University of Science and Technology, J-TEXT TEAM — Research on Alfvén waves and Alfvén eigenmodes(AEs) is of importance in tokamak plasma physics, such as investigation of interaction between energetic particles and AEs, turbulence and anomalous transport due to AEs, and so on. In order to study the Alfvén eigenmode excitation, damping features and the interaction between AEs and plasma transport, an Alfvén antennas system is designed for the J-TEXT tokamak. The system can generate high frequency magnetic field aiming to excite the AEs, especially toroidal Alfvén eigenmodes (TAE). For a typical J-TEXT plasma ($B_T= 1-2.2$ T, $n_e = 3-6 \times 10^{19} \text{m}^{-3}$), the computed gaps in the Alfvén continua range from 300 to 500 kHz, with respect to the Alfvén waves dispersion relation [1]. Three pairs of antennas are designed at different toroidal angles respectively on the low field side. Each pair consisting of two coils installed with angles of $\pm 45^\circ$ off the mid-plane along the poloidal direction. With this system, magnetic field components of mode number $m=1-10$, $n=1-20$ can be produced. The calculations show that the magnetic field in the LCFS can reach $\sim 10\text{Gs}$ totally while about $\sim 0.5\text{Gs}$ for each mode number, with the coil current of 20A.

[1] Zonca F. Chen L. 1996 Physics of Plasmas 3 323.

¹Corresponding author

Jiyang He
Huazhong University of Science & Technology

Date submitted: 24 Jul 2015

Electronic form version 1.4