

Abstract Submitted  
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**Wave Characteristics of Large-Diameter, High-Density Helicon Plasma with Short Axial Length**<sup>1</sup> TAISEI MOTOMURA, KENJI TANAKA, KATSUHIKO MURAKAMI, SHUNJIRO SHINOHARA, Kyushu Univ., Japan, TAKAO TANIKAWA, Tokai Univ., Japan, SHAMRAI KONSTANTIN, INR, NAS of Ukraine — We have developed a large-diameter (73.8 cm) helicon device with an axial length of 486 cm that utilizes a flat spiral antenna at ISAS/JAXA [1]. It has been realized that a shorter axial length is desirable in certain applications. Therefore, the axial length has been shortened in a range of 12 to 123 cm by installing a movable termination plate. Even with very short axial length, the plasma density can exceed  $10^{12} \text{ cm}^{-3}$  ( $p_{Ar} = 0.75 \text{ mTorr}$ ) with the input rf power of less than 4 kW, showing a rather high plasma production efficiency. When the axial length is relatively longer, the excitation of the higher order radial eigenmodes is found to be correlated with the magnetic field configuration and the radial density profile. When the axial length is further shortened, the axial wave structure tends to become standing wave like, where its wavelength depends on the plasma density and axial length as is expected. The details of the experimental results will be discussed in the presentation. [1] S. Shinohara and T. Tanikawa, Rev. Sci. Instrum. **75**, 1941 (2004) & Phys. Plasmas **12**, 044502 (2005).

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