

Abstract Submitted
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Characteristics of helicon-plasma produced using a segmented multi-loop antenna¹ TAKAO TANIKAWA, Tokai Univ., Japan, SHUNJIRO SHINOHARA, YASUSHI IKEDA, TOHRU HADA, Kyushu Univ., Japan, KYOICHIRO TOKI, Tokyo Univ. of Agriculture and Technology, Japan — The usefulness of using a flat spiral antenna, which is installed just outside a insulator window at the end of a vacuum chamber, to generate helicon-plasma has been proven in a large device [1–2]. We have applied a similar technique to a smaller device (20 cm in diameter and 100 cm in axial length), but using a newly designed flat antenna for plasma production. The antenna consists of four concentric loops. Each of three outer loops is equally divided into four segments. The central loop is divided into two equal length segments. By varying the electrical connection among the antenna segments, it is possible to excite not only waves with $m=0$ but also waves with $m=1$ or higher, where m is the azimuthal mode number. With the $m=0$ excitation, helicon-plasma ($n_e \geq 10^{12} \text{ cm}^{-3}$) can be obtained at $P_{rf} \geq 2 \text{ kW}$ (Ar, 2 mTorr range). With the $m=1$ excitation, it is more difficult to attain helicon-plasma. The input rf power of 4 kW or higher is necessary. [1] S. Shinohara and T. Tanikawa, Rev. Sci. Instrum. **75**, 1941 (2004); Phys. Plasmas **12**, 044502 (2005). [2] T. Tanikawa and S. Shinohara, Thin Solid Films **506-507**, 559 (2006).

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