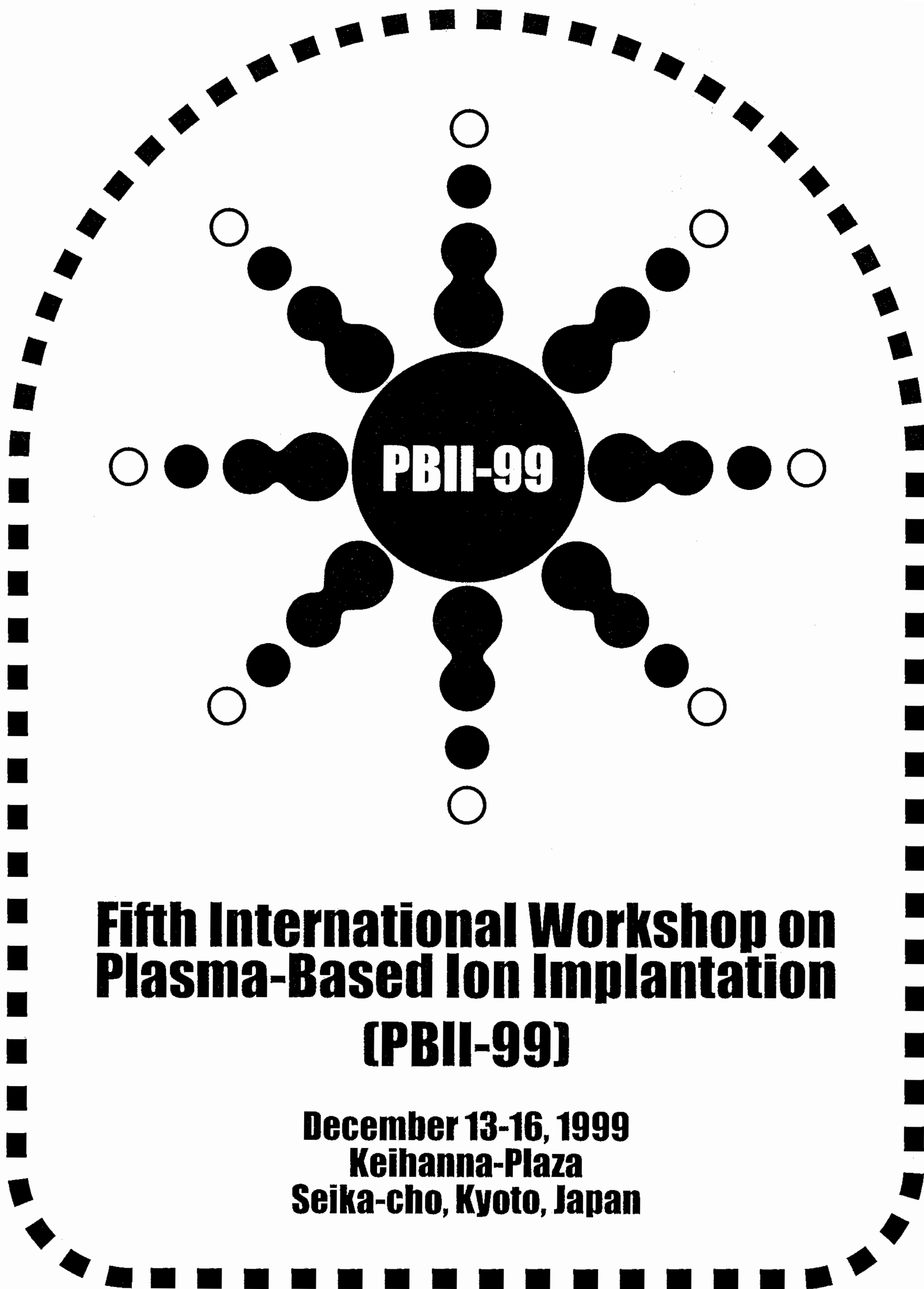

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ABSTRACTS

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Ion dose and dose uniformity improvement using high frequency, low voltage plasma immersion ion implantation

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The use of elevated-temperature plasma immersion ion implantation (PIII) to increase the surface hardness and thickness of the modified layer is well documented. Traditionally, this involves the use of high energy (typically above 5keV) at a low current density. In this paper, we present experimental results demonstrating the advantage of high frequency, low voltage plasma immersion ion implantation (HLPIII). The technique emulates conventional elevated temperature PIII and can increase the ion dose and dose uniformity substantially. This can be attributed to the thin ion sheath and high ion current density in the HLPIII process. The Auger depth profiling results indicate that the retained dose of the sample treated by the low voltage process (1keV) is more than 6 times higher than that by elevated temperature, high voltage PIII (15keV and 300°C). We will compare the experimental data to theoretical simulation results and also demonstrate the excellent ion dose uniformity on a target with a square bar shape on a finite plane.