

Abstract Submitted  
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**Time-resolved X-ray PIV measurements of hemodynamic information of real pulsatile blood flows**<sup>1</sup> HANWOOK PARK, EUNSEOP YEOM, SANG JOON LEE, Department of Mechanical Engineering, Pohang University of Science and Technology — X-ray imaging technique has been used to visualize various bio-fluid flow phenomena as a nondestructive manner. To obtain hemodynamic information related with circulatory vascular diseases, a time-resolved X-ray PIV technique with high temporal resolution was developed. In this study, to embody actual pulsatile blood flows in a circular conduit without changes in hemorheological properties, a bypass loop is established by connecting a microtube between the jugular vein and femoral artery of a rat. Biocompatible CO<sub>2</sub> microbubbles are used as tracer particles. After mixing with whole blood, CO<sub>2</sub> microbubbles are injected into the bypass loop. Particle images of the pulsatile blood flows in the bypass loop are consecutively captured by the time-resolved X-ray PIV system. The velocity field information are obtained with varying flow rate and pulsatility. To verify the feasibility of the use of CO<sub>2</sub> microbubbles under *in vivo* conditions, the effects of the surrounding-tissues are also investigated, because these effects are crucial for deteriorating the image contrast of CO<sub>2</sub> microbubbles. Therefore, the velocity information of blood flows in the abdominal aorta are obtained to demonstrate the visibility and usefulness of CO<sub>2</sub> microbubbles under *ex vivo* conditions.

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