

## **The Application of Disturbance Response Decoupling to the Vibration Control of an Electron Beam Projection Lithography System**

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### **Abstract**

This paper discusses the vibration control of an Electron Beam Projection Lithography (EPL) system employing a newly developed technique, called disturbance response decoupling (DRD). Due to the resolution requirement, vibration control of EPL systems is increasingly important. To satisfy the performance criteria, we need to consider two kinds of disturbances for an EPL system, namely load disturbances from the machine and ground disturbances from the environment. Consequently, the controller design can be very complicated by traditional approaches due to the conflicting requirements for these two disturbances. Therefore, in this paper we applied DRD techniques to deal with the performance requirements independently. The work was carried out in three parts. First, passive isolators were used to isolate the ground disturbances. Second, active components were applied to improve the system responses to load disturbances. Finally, the system was integrated to verify the overall performance. From the simulations and experiments, the proposed control strategies were deemed effective.