

Abstract Submitted  
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**Vortex ring impingement and particle suspension** MATTHEW STAYMATES, GARY SETTLES, Penn State University — Previous research has shown that the impact of a vortex ring with a solid surface can dislodge particles attached to that surface and suspend them in the surrounding fluid. A possible use for this phenomenon arises in the detection of trace explosives on clothing and belongings: Once liberated from the surface, suspended particles can be collected and interrogated. The current technology successfully uses round turbulent jets for this purpose, but also generates a large concomitant airflow due to entrainment. Here we present the results of initial experiments to construct vortex-ring generators producing a similar particle release from surfaces with much less entrainment than jets. A discussion of vortex-ring-generator design issues and semi-quantitative flow visualization results will be presented. Both normal and oblique vortex-ring impacts are considered.

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