

## EXPERIMENTAL PRODUCTION OF VORTEX RINGS

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One frequently finds references to the use of smoke rings in demonstrating the properties of vortex motion. Detailed methods for producing such rings on a scale for classroom use are rarely given. After trying boxes of many sizes and shapes it was found that a ply-wood box twelve inches square and three feet long closed at one end with a metal plate having a circular aperture in its center gave reliable and satisfactory performance. A piston with felt tacked around the edges was fitted snugly in the box and provided with a handle so that it could be pushed the entire length of the box. A circular aperture with a diameter of four inches was used. Other diameters were equally satisfactory, however. The smoke was produced by burning small pieces of

camphor gum placed in a metal pan just back of the aperture. Rings were projected by forcing the piston forward in the box. The speed, stability and distance of projection depends on the rate and distance the piston is moved forward. In a room relatively free from air currents, rings were projected 30 feet from a four inch aperture by quickly moving the piston forward two inches at a time. A series of ten or a dozen rings can be projected in succession by this method.

Camphor gum smoke rings were more stable and more "traceable" than those from sal-ammoniac or titanium tetrachloride vapors. The heavy particles of carbon are somewhat sooty, but seem less objectionable than the corrosive vapors.

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