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A portable needle-free jet injector based on a custom high power-density voice-coil actuator.

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Abstract

We have constructed a portable needle-free drug injection (NFI) device based upon a custom voice-coil linear actuator. Our actuator is optimized to provide high instantaneous force (>200 N) and power (4 kW) while still allowing a total stroke of 25 mm. The actuator is relatively inexpensive, compact, and lightweight, allowing it to serve as the force generator in a portable, reusable, handheld NFI system. The actuator is capable of accelerating liquid drug in quantities of up to 250 microL to a speed of more than 200 ms⁻¹. The repeatability of a 50 microL volume ejection is better than +/-1 microL.

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