

Electromagnetic Coilgun with Three Accelerating Stages
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Abstract

An electromagnetic coilgun with three stages of accelerating coils is designed and built. Conventional projectile propulsion mechanisms include the use of compressed air/spring or explosion which places theoretical limits on the maximum muzzle velocity governed by laws of thermodynamics. Electromagnetic coilgun, on the other hand, explores the use of electromagnetism in accelerating projectiles which offers a much higher theoretical limit on muzzle velocity. One attractive feature of an electromagnetic acceleration system that cannot be provided by conventional propulsion systems is that acceleration can be provided to a projectile in different stages as it moves along a barrel, where conventional propulsion system can only provide one burst of impulse at triggering. We place emphasis on the use of multi-stage accelerating coils in our design, designing three stages for, ideally, 100 m/s muzzle velocity.