CENTRE FOR JOINT WARFARE STUDIES

CENJOWS

CHINESE MAGNETIZED PLASMA ARTILLERY

1. **China to Test Magnetized Plasma Artillery.** The Chinese military (People's Liberation Army (PLA) weapon and equipment procurement website weain.mil.cn in Feb 2019) recently published a notice inviting researchers to devise a weapon that sounds like a sort of electromagnetic rail gun—which uses magnetism instead of gunpowder to fire shells—that several nations are developing. But actually deploying railguns has been hampered by the size of the weapon and especially the vast amount of electrical energy needed to propel a shell to speeds of greater than Mach 7. For example, despite years of research and vast sums of money, *the U.S. Navy* appears less than optimistic about fitting railguns *on its warships.* But Chinese scientists believe that magnetized plasma artillery will be so light and energy-efficient that it can be mounted on tanks.

2. Although the weapon sounds as if it comes from a sci-fi movie, it will probably not shoot high-energy plasma but ultra-high velocity cannon shells. The notice did not elaborate on the nature of magnetized plasma artillery. However, the PLA Academy of Armored Forces Engineering filed a patent with the same name in 2015 to the National Intellectual Property Administration. The notice invites tenders for a theory-testing and a launch system for magnetized plasma artillery.

3. **Principle.** According to the specification of the patent, the cannon will have magnetic material covering the gun barrel and a magnetic field generator to create a certain magnetic field inside the barrel. When artillery is fired, gas inside the barrel will be partly ionized into plasma by the high pressure and heat. The plasma will then form about a millimeter sheath on the inner wall of the barrel due to the magnetic field, the patent specification said.

4. The magnetized plasma layer can greatly reduce the radial force the barrel takes and boost thrust of the cannon shell, making it possible for the initial velocity of shells to exceed Mach 6, the limit for conventional artillery.

5. By comparison, an electromagnetic railgun can in theory accelerate its munitions to Mach 7, US-based media outlet the National Interest reported. But a railgun and its power system are so large that they are not mobile unless installed on large warships, the report said. The patented Chinese technology, however, can be installed on tanks and self-propelled guns, the specification said.

6. Wei Dongxu, a Beijing-based military analyst, told that due to the increased thrust, the range of the artillery can also be extended. Wei predicts the new technology would extend the range of a conventional 155-millimeter self-propelled howitzer from 30-50 kilometers to 100 kilometers. He added that the plasma layer might also reduce friction between the barrel and rounds, making the weapon more accurate. The layer can also provide heat resistance to the barrel, which will prolong its service life.

7. Dennis Killinger, a professor emeritus of physics at the University of South Florida, called the idea “intriguing.” “The idea seems possible,” he told the *National Interest*. “My main question is what is the lifetime of the plasma and is it sufficient during the launch time inside the barrel.”

8. It is also a different approach than a railgun. “I don’t think that you can think of it as an offshoot of the classic railgun technique since the railgun is more a linear motor (moving mag field) approach using a fixed stator (i.e., bullet) similar to the linear accelerators used for the newer roller coasters. This new, patented technique uses plasma which interacts with the magnetic field and serves as a liner for the barrel.”

http://www.globaltimes.cn/content/1139224.shtml

https://nationalinterest.org/blog/buzz/report-china-developing-deadly-magnetized-plasma-artillery-worried-89941