

The Dark Side of the EMDrive

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The current debate over the theoretical operation of the EMDrive has created a controversy that may upset our current theories of physics and if validated, gives us a gateway to space travel that we have not known before. If it is true that the EMDrive and its variants (such as the Cannae drive) are producing a tiny thrust for just the input of microwave power into a cavity without the requirement to carry any propellant into space, the promise of distant space travel is open before us.

With no requirement of the storage of a propellant, the mass of a rocket ship is lowered drastically when considering distant voyages. If the mass of EMDrive and its power source (let's say solar cells or a Plutonium battery) were only 1 Kg, for instance, it can reach a phenomenal speed in a short period of time with just a little thrust from the EMDrive. For a 1 Kg mass that is generating a thrust of 0.1 Newtons in the vacuum of space, this little ship will have a constant acceleration of

0.1 meters per second-squared and can reach 9,460,800 meters per second (about 3% the speed of light) in three years. The kinetic energy it has amounts to 89,506,736,640,000 Joules of energy, which is equivalent to a 21 Kiloton nuclear device, similar to what was dropped on Nagasaki during World War II. This is all from a 1 Kg EMDrive launched out of Earth's gravity and directed around the solar system to increase its speed for 3 years based on currently plausible EMDrive thrusts.

Although the dream of travelling to the stars faster is understandably exciting, the potential threat of such a high-kinetic device is also terrifying. The current thrust-to-mass ratios of the EMDrive are bound to improve if the effect is validated, leading to higher accelerations for newer designs that come out. The fact that a Do-It-Yourselfer in his garage can build an EMDrive leads one to wonder what levels of sophistication the EMDrive will achieve when a government lab starts improving on it, once the nature of its operation is understood. The possibility of the EMDrive reaching Megaton energy levels, while spending a year accelerating in space, is

entirely within the scope of engineering in the next few years if the effect is verified.

As the current thrust levels reported for the EMDrive are very low, the device does need a boost to get into orbit before it's useful, but orbital payloads are getting cheaper every year, with the cost of the CubeSat payloads being less than 30,000 USD as of 2016. In fact, it is reported that the Cannae drive will be tested in orbit next year, thanks to dropping prices of small-satellite launches.

With the new ideas being discussed for significantly increasing thrust-to-mass ratio in the EMDrive, such as stimulated emissions and higher-Q cavities, it may be wise for us to pause and consider the darker side of this new technology. As with all promises of a new technology, there always seems to be a more sinister use that isn't fully identified upfront. With the EMDrive, the promise of distant space travel is balanced with the fear of a new kind of weapon of mass destruction. No nuclear materials are required for this new WMD – just a trip into space, a microwave oven and metal container that is honed to the right dimensions. As we ponder the abilities

of this new technology, let us not forget the words of an icon by the name of Robert Oppenheimer from the 20th century after his encounter with such a new technology – “Now I am become Death, the destroyer of worlds”. If we are on the age of new revolution with the EMDrive, let’s hope we can keep this Pandora’s box from leaking anything too dangerous.