

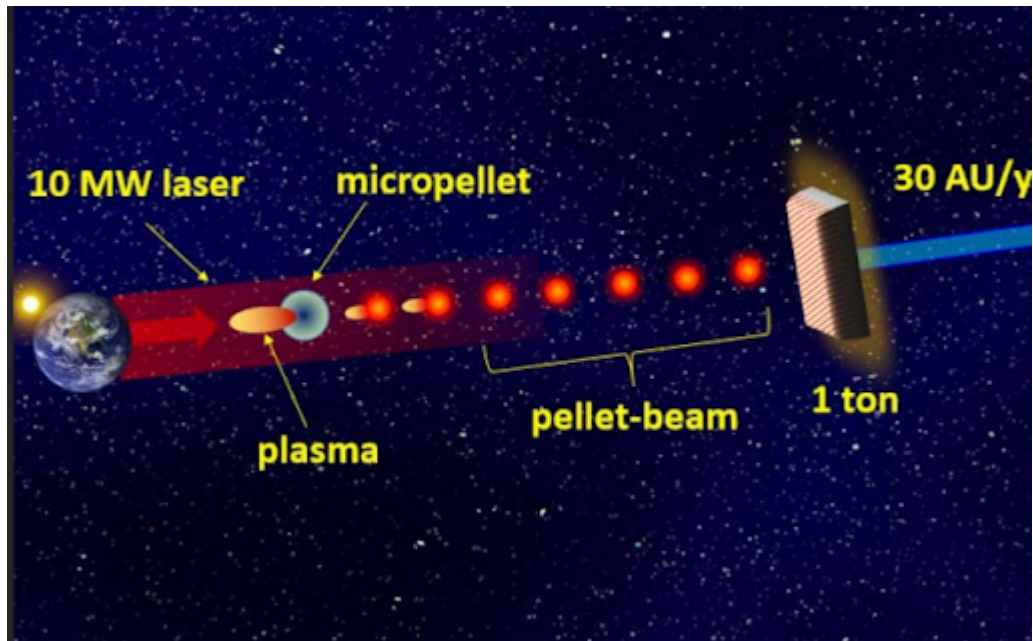
Pellet-beam propulsion

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In news– The concept, known as ‘pellet-beam’ propulsion, was awarded an early-stage US\$175,000 NASA grant for further development recently.

About the pellet-beam’ propulsion system-

- This system could theoretically beam a heavy spacecraft to outside the confines of our Solar System in less than 5 years – a feat that took the historic Voyager 1 probe 35 years to achieve.
- The concept currently doesn’t exist much beyond calculations on paper.
- **The pellet-beam concept was partly inspired by the Breakthrough Starshot initiative**, which is working on a ‘light-sail’ propulsion system.
- With the help of millions of lasers, a tiny probe would theoretically be able to sail to neighboring Proxima Centauri in just 20 years.
- The new proposal starts with a similar idea, throw fuel at a rocket instead of blast it out of one but it looks at how to shift larger objects.
- To work, the conceptual propulsion system requires two spacecraft – one that sets off for interstellar space, and one that goes into orbit around Earth.
- The spacecraft orbiting Earth would shoot a beam of tiny microscopic particles at the interstellar spacecraft.
- Those particles would be heated up by lasers, causing part of them to melt into plasma that accelerates the pellets further, a process known as laser ablation.



- Those pellets could reach 120 km/second (75 miles/second) and either hit the sail of the interstellar spacecraft or repel a magnet within it, helping to propel the spacecraft to huge speeds that would let it whizz out of our heliosphere – the bubble of solar wind around our Solar System.
- With the pellet-beam, outer planets can be reached in less than a year, 100 AU [astronomical unit] in about 3 year and solar gravity lens at 500 AU in about 15 years.
- For context, an **AU, which stands for 'astronomical unit', roughly represents the distance between Earth and the Sun, or around 150 million km (93 million miles).**
- It took the Voyager 1 probe 35 years of travel to cross into interstellar space back in 2012, at roughly 122 AU away.
- According to the current projections, a pellet-beamed spacecraft weighing 1 ton could do the same in under 5 years.