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RPI claims battery-fueled, room-temp fusion

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Portland, Ore. -- It won't power the starship Enterprise, but an experimental "dilithium crystal" pyroelectric technology is said to enable compact nuclear fusion.

Engineers at Rensselaer Polytechnic Institute (Trc
charged centimeter-sized lithium tantalate crystals
battery at room temperature.

"In a [conventional] fusion device de- signed to pr
further heats the plasma, thereby sustaining the r
of the fusion reaction, but we cannot use it to sus
associate professor Yaron Danon.

"Instead, we plan to use the energy emitted to cre
applications in non- destructive testing or, possibly

Indeed, Danon predicts that different application a
energy particles that a pyroelectric crystal acceler
neutrons and X-rays. The electrons that pyroelect
therapeutic purposes, such as cancer treatments,
energy emissions might be used to inspect cargo

Danon performed his research for the Department
Saglime, doctoral candidates in nuclear engineerin

How it works

In the traditional fusion-reactor, high temperatures
in a superheated plasma. Instead of millions of de
the plasma, dilithium-crystal fusion uses 100- kilov
(deuterium) molecules onto a target, achieving nu
or low-temperature cryogenic cooling.

The fusion device depends on the piezoelectric-lik
(or cooling) the crystals induces a 100,00-V electr
an insulator, but its lattice structure responds to h
side of the crystal, leaving behind positively charg

"When you heat or cool the crystal . . . it becomes
crystal is an insulator, when it becomes polarized
voltage output is the charge, which is big, divided
thereby making the voltage swing huge--over 100

Traditional portable neutron sources are at least a
supply that can deliver 250,000 electron-volts. Ins
200,000-V electric field by opposing two pyroelect
Whenever the pyroelectric crystals are heated or
naturally produce the high-voltage field.

"We don't require external high-voltage power sup
watts to heat the crystal to get its high-voltage ou
our device is only about 15 x 15 centimeters, and
predict our next-generation device can be much s
only about 2 x 1 cm."

By using the field to accelerate deuterium oxide a
engineers fused two deuterium atoms into helium,
neutron particles--the hallmark of nuclear fusion.