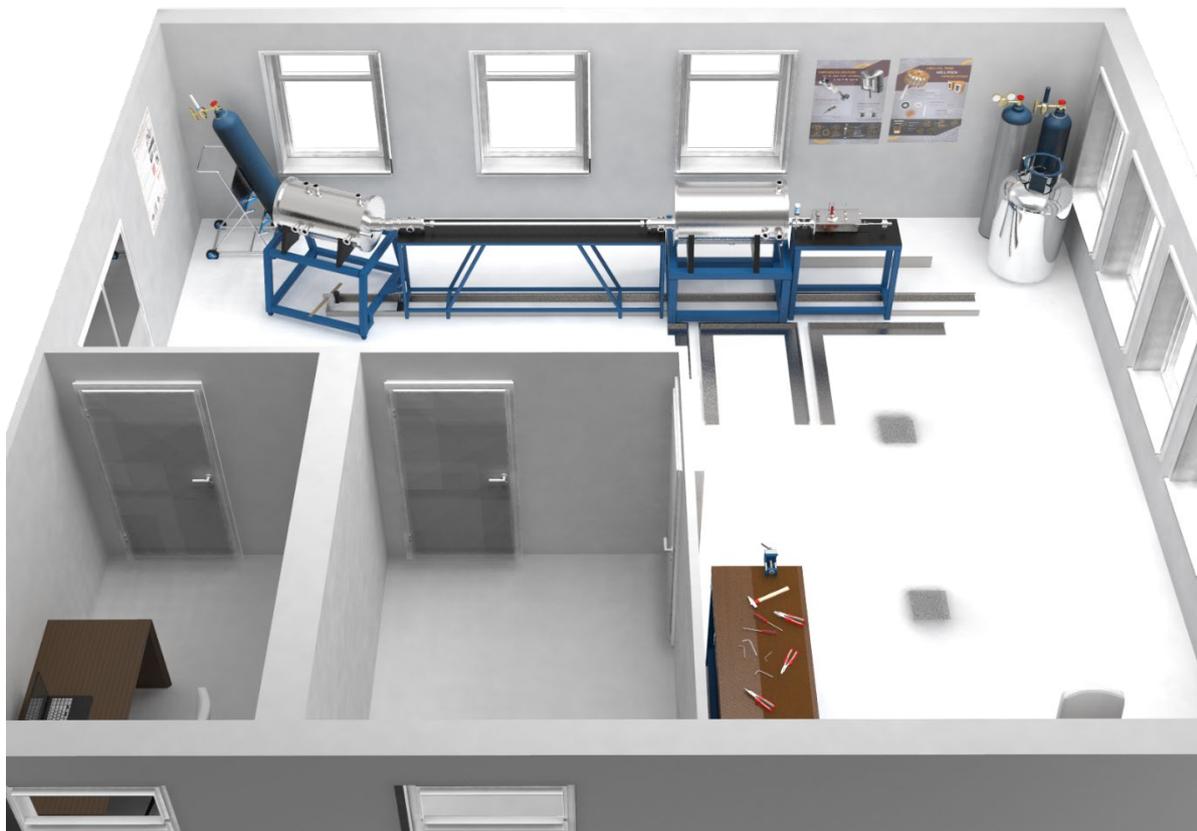


One of the key technologies for the first power plant-sized fusion reactor to be tested at the Centre for Energy Research

Hungarian researchers and companies will develop a machine protection system for the international fusion project [ITER](#). The *Shattered Pellet Injector* is designed to quickly quench the fusion reaction before it can damage the inner walls. The project was made possible through a 2.4 million euro tender won by the [Fusion Plasma Physics Department](#) of the [Centre for Energy Research](#), [Eötvös Loránd Research Network](#) together with several Hungarian companies.

The terrestrial realization of the energy production of stars has been the desire of mankind for half a century. The ITER experiment currently under construction in France is a major step in this direction. In this device, heated to a temperature of 100 million °C – ten times hotter than the temperature in the middle of the sun – charged hydrogen gas (plasma) fuses into helium, producing ten times more energy than is used to heat the [reaction](#). Igniting a star on Earth will take the most complex device mankind has built to date. This international ITER project presents a tremendous challenge and opportunity for companies to develop their know-how.

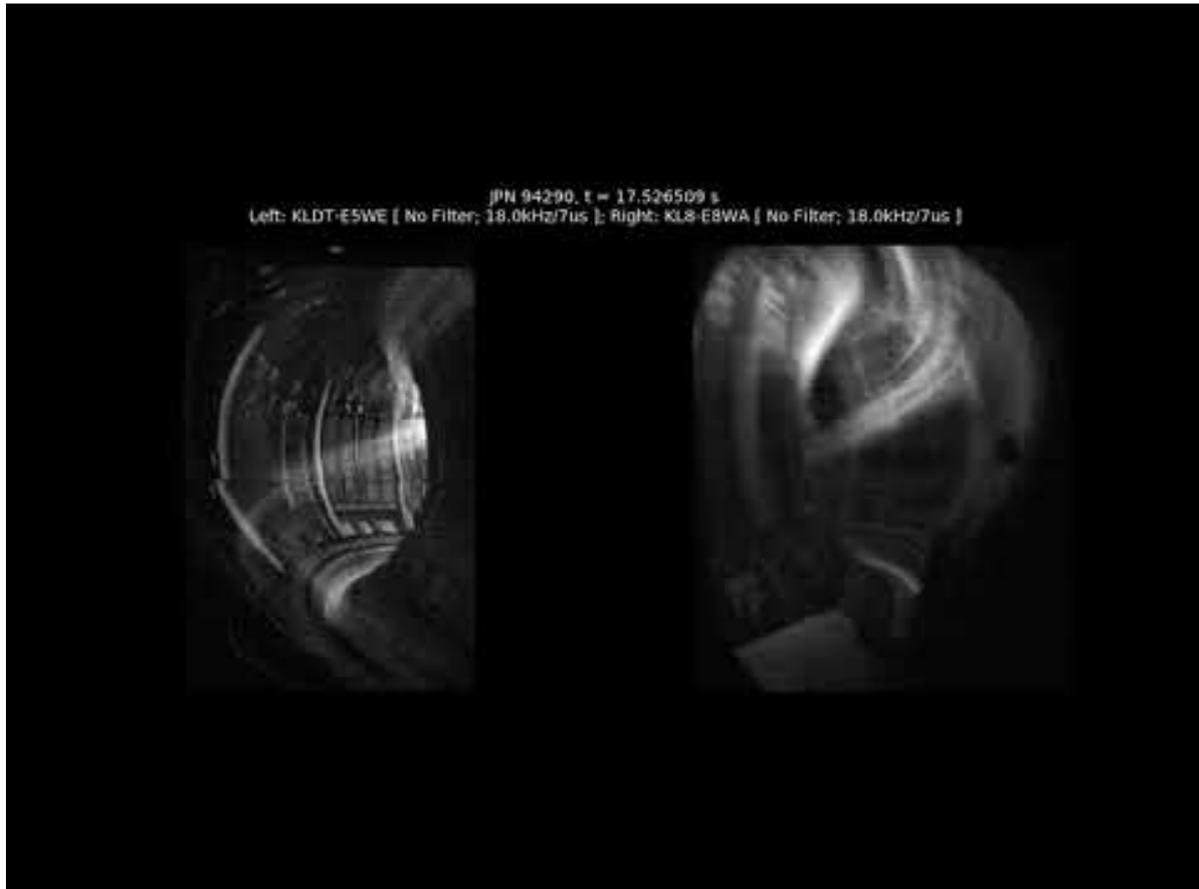


Rendered Image of the Shattered Pellet Test Laboratory at Centre for Energy Research

While starting up ITER will be a milestone, it is also critical to be able to shut down the experiment safely. The hot plasma is shot with hundreds of small ice particles, by firing a projectile made out of minus 260 °C hydrogen ice, also known as a pellet, against a plate with high velocity. This, like a

shotgun, [scatters](#) the pellet into small pieces of ice, in terms of its function as a kind of powder extinguisher.

As a result of the research in the last decade, a prototype of the Scattered Pellet Injector can now be built in Budapest. Researchers at the Centre for Energy Research will make a significant contribution to the future safe operation of ITER by testing the production, acceleration and fracture of pellets, the engineering design of the launcher and the development of the necessary experimental and monitoring methods.



Shattered Pellet Injector being tested on ITER's predecessor, the European JET tokamak

The gas system of the Shattered Pellet Injector is provided by [H-Ion Ltd.](#), while the cryogenic design is built with the help of [VTMT Ltd.](#) This project builds on the Hungarian contribution to ITER started by [Wigner RCP](#), [C3D Ltd.](#), [GEMS Ltd.](#) and [Fusion Instruments Ltd.](#), showing the high value of Hungarian researchers and high-tech companies to this exciting international project.

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