



FUSION RESEARCH

SPINNING OFF SHORT-TERM BENEFITS

The road to realising fusion energy is paved by physics, material sciences, high-precision engineering, robotics, computing and modelling. And, on the way to achieving fusion energy, the road diverged into some surprising directions with fascinating results. Here are some examples.



Medical Technologies



Medical magnetism
Superconducting magnets, which are being perfected to control fusion reactions, also lie at the heart of MRIs, an indispensable tool for doctors.

Environment



Squeaky clean
High-tech industrial wastes need high-tech cleaning approaches. Palladium alloy membranes, originally developed for cleaning up fusion waste, effectively treat effluents from chemical and automobile industries.

Superconductors



Super-conducting powers
From energy, transport, electronics to medicine, superconductors are powering varied advances. But what has powered advances in the superconducting industry? Fusion!

Telecommunications



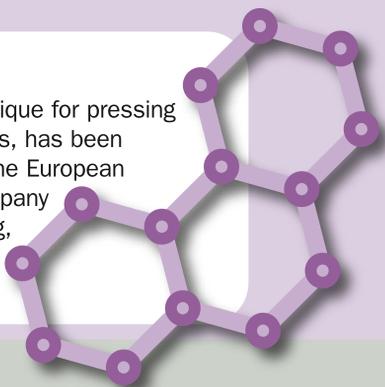
The right kind of signals
Work on gyrotrons, ITER's powerful plasma heaters, allowed the start-up company, SWISSto12, to tap into terahertz signals.

Theoretical Physics



Sharing equations
The interdisciplinary nature of fusion research means an ongoing exchange of ideas among theoretical physics domains: plasma physics, fluid dynamics, astrophysics, turbulence, just to name a few.

Material Sciences



It's a material world
Explosive metal forming, a technique for pressing metal sheets into desired shapes, has been extensively used for devices in the European fusion programme. Now the company that does this, 3D Metal Forming, has expanded its client base to include the aeronautics industry.

Remote Handling



Remote future ... not so remote
Remote handling techniques that are being used in EUROfusion's JET Tokamak, are being applied to high-energy physics, space science, nuclear decommissioning, and modern surgical methods.

Fusion Spin off sources

- ITER Newline: Fusion Research Benefits to Society Series
- a. Swissto12: <https://www.iter.org/newsline/289>
- b. 3D Metal Forming: <https://www.iter.org/newsline/290>
- c. ENEA, developing palladium-silver-alloy membranes: <https://www.iter.org/newsline/291>
- d. Remote Handling, Oxford technologies Limited: <https://www.iter.org/newsline/292>
- The Surprising Benefits of Creating a Star, brochure produced by General Atomics for U.S. Dept. of Energy: http://www-fusion.ciemat.es/New_fusion/en/Fusion/documentos/Spinoff_Brochure.pdf
- Fusion Spin-offs in Europe: <http://www.fusenet.eu/node/661>
- ENEA Fusion Spin off: <http://www.fusione.enea.it/SPINOFF/innovazione.html.en>
- Fusion Energy, Moving Forward; Spin-off Benefits from Fusion R&D, produced by European Commission: <https://www.ipp.mpg.de/1516644/Spinoff-EN.pdf>
- Engineering fusion: Out of the tokamak and into industry: <https://www.euro-fusion.org/newsletter/engineering-fusion-out-of-the-tokamak-and-into-industry/>
- Fusion Technologies: <http://www.esa-tec.eu/fusion-technologies/>