

Hands-on plasma physics for teaching labs and workforce programmes — from €28,000

What it is

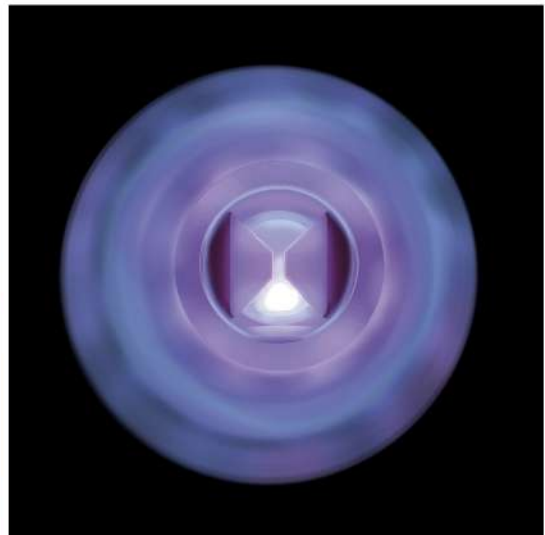
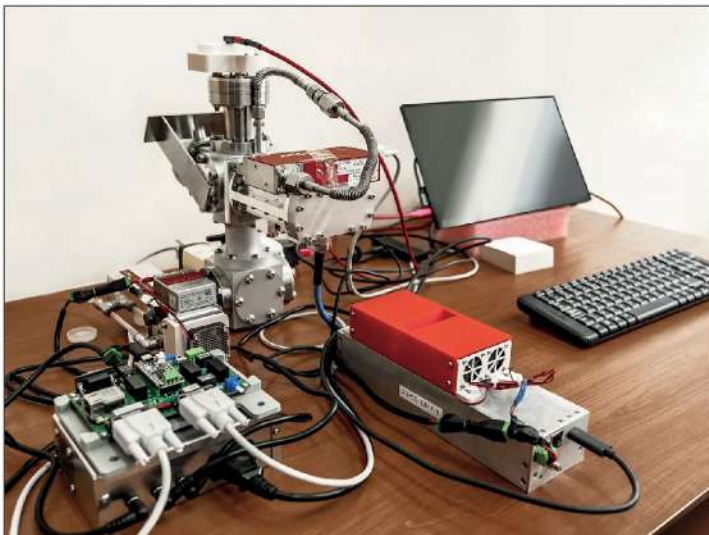
Alpha-E Plasma is a bench-scale plasma physics platform designed for undergraduate physics programmes and workforce training programmes. Students generate real plasma, control it themselves, and measure its properties directly using built-in diagnostic instruments. It is not a demonstration kit. Students operate the device, adjust parameters, collect data, and draw conclusions from what they measure.

The problem it addresses

Plasma physics has long lived in two worlds: deep in research infrastructure on one side, and on the whiteboard on the other. The experimental middle ground, accessible to students at the bench, has been largely absent from teaching programmes, because the equipment hasn't been available. That's the gap the Alpha-E Plasma is designed to close. Purpose-built for the teaching environment, and with a support model that is suited for a wide range of educational institutions.

What students actually do

Students adjust gas composition and microwave power and watch the plasma respond in real time. They use the Langmuir probe to measure electron temperature and ion density. They use the optical emission spectroscopy port to observe how different gases produce different emission spectra. Every parameter they change produces a measurable result they can analyse. For semiconductor and workforce programmes: students gain direct operating experience with plasma generation and diagnostics — the same underlying physics they will encounter in reactive ion etching, deposition, and other plasma-based fabrication processes.



Key specifications

Plasma source	ECR microwave discharge
Diagnostics	Langmuir probe; optical emission spectroscopy port; pressure and power monitoring
Safety	No radioactive materials; standard laboratory safety protocols apply
Architecture	Open, modular; students can see all components; configurable for different experiments
Footprint	Benchtop; approximately the size of a large desktop computer; standard utilities
Curriculum	8–12 structured lab modules; instructor guides; defined learning outcomes
Support	Onsite installation; faculty training; ongoing remote technical support

Why open architecture matters in a teaching environment

Faculty and programme directors consistently told us that students learn more when they can see how the equipment works. A sealed, integrated device teaches students to operate a black box. An open, modular device teaches them the physics behind the measurements. Alpha-E Plasma is designed with this in mind. All major components are visible and accessible. Students can follow the signal path from plasma generation through diagnostics to data. They can change gas compositions, adjust pressures, and observe directly how their inputs change the plasma behaviour they measure.

What's included

- 8–12 structured lab modules covering plasma generation, diagnostics, and confinement concepts
- Instructor guides with experimental context and teaching notes
- Student assessments aligned to defined learning outcomes
- Onsite installation and faculty training
- Safety and compliance documentation for institutional approval processes
- Ongoing remote technical support
- Modular expansion capability — add experiment modules and diagnostics over time

For semiconductor and workforce programmes

The semiconductor industry runs on plasma. Reactive ion etching, physical vapour deposition, plasma-enhanced CVD, and surface treatment processes are all plasma-based. Students who have seen plasma form, measured its parameters, and understood the relationship between process inputs and plasma behaviour are better prepared for the lab environments they will enter. The Alpha-E Plasma curriculum includes modules specifically oriented to plasma-based industrial processes, giving workforce programmes a defensible employer-validation argument for the purchase.

"Anytime that you can actually show a physical phenomenon to a student, it's very valuable."

Prof. Ricardo Alarcon, Arizona State University

In use at:

PURDUE
UNIVERSITY

Nuclear Engineering
Department - West Lafayette, USA



Faculty of Physics
Sofia, Bulgaria

NYCU
NATIONAL
YANG MING CHIAO TUNG
UNIVERSITY

Department of Physics
Hsinchu, Taiwan



To request a demonstration or discuss
your programme's requirements,
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