Introduction and Welcome EPFL-SPC

Kamil Sedlak

January 14, 2026

SWISS PLASMA CENTER

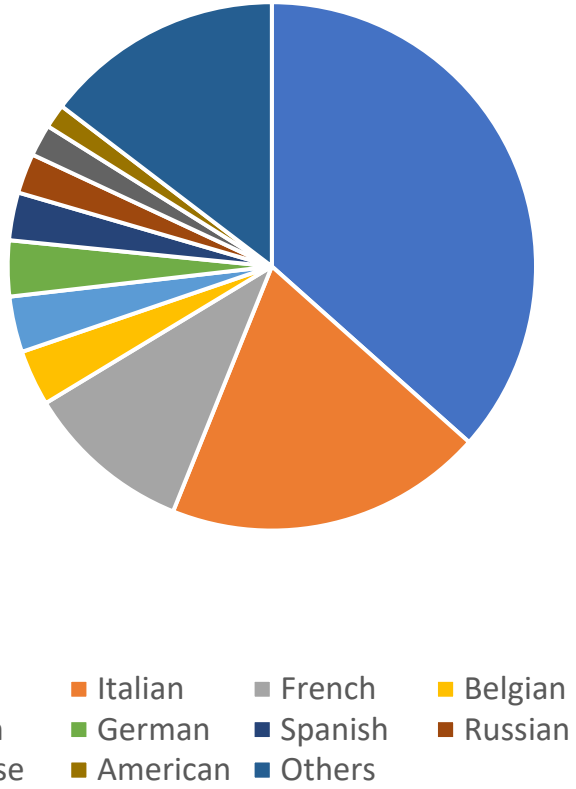
SPC – the Largest Laboratory of EPFL in Lausanne

SPC Now Counts 200 Staff Members

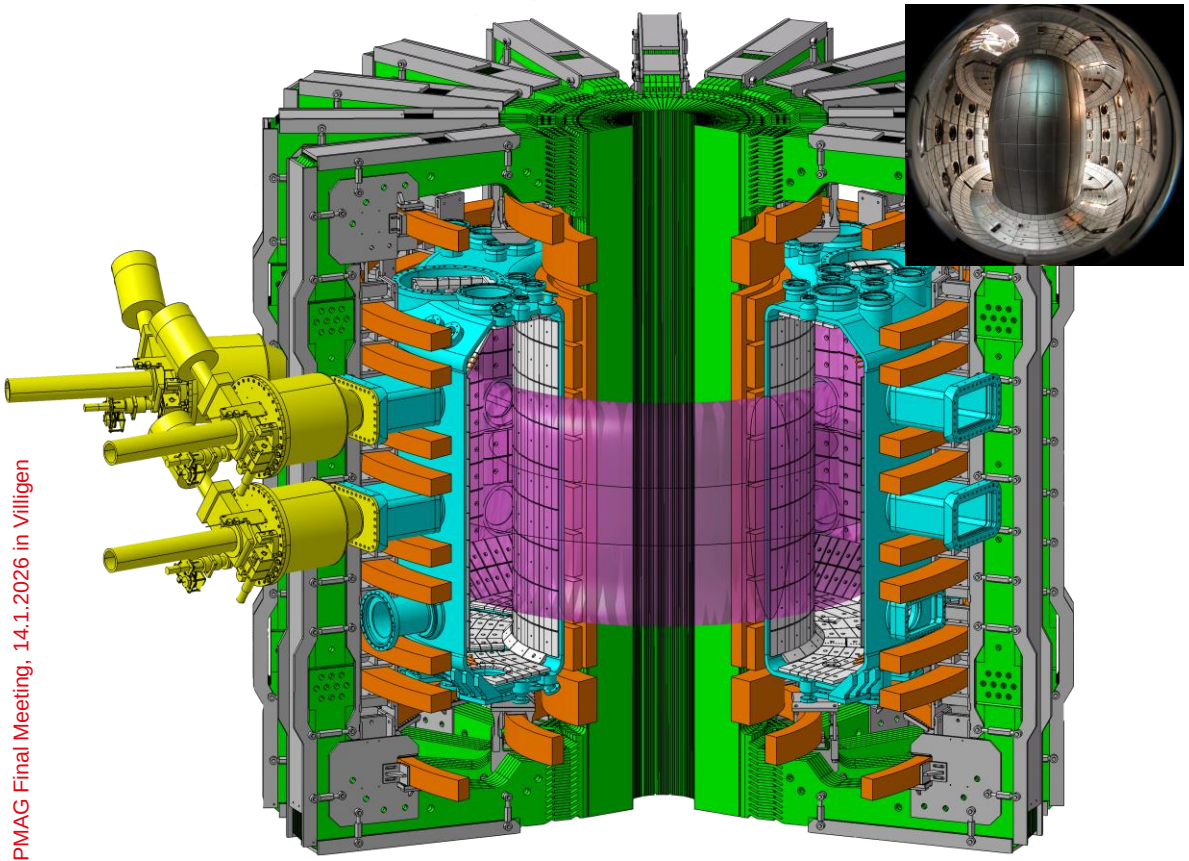
- Majority of SPC (180 people) works on plasma research in Lausanne.
- 20 people working on applied superconductivity is based at premises of PSI in Villigen.

Research Lines of SPC

- Tokamak Physics - TCV
- Plasma Heating
  - FALCON: testing of ITER Gyrotron components
  - T-Rex: experiment to understand electron cloud formation
- Theory
  - Studies of core and boundary turbulences in plasma
  - Plasma control
  - Advanced modelling on powerful computing clusters
- Low Temperature Plasma and Application
- Applied Superconductivity



TCV: the Most Flexible Tokamak Worldwide



R_{major} = 0.9 m
R_{minor} = 0.25 m

I_p < 1 MA
B_T < 1.54 T
2.3 MW NBI heating
3.75 MW ECRH

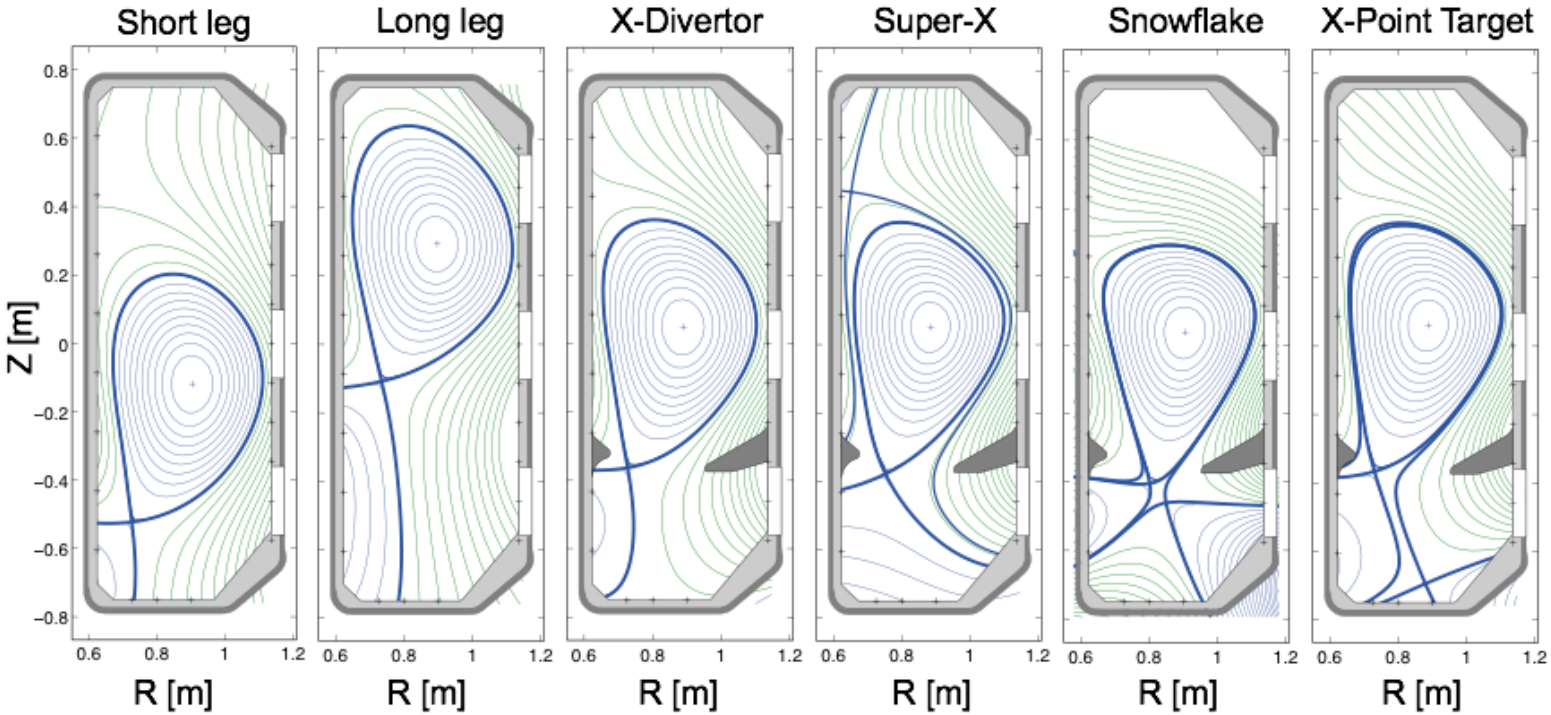
Independently powered
16 shaping coils
2 OH coils
1 internal vertical control coil

κ < 3, -0.6 < δ < 0.9

Graphite tiles
Internal divertor baffles

More than 40 international institutions participate in the TCV program

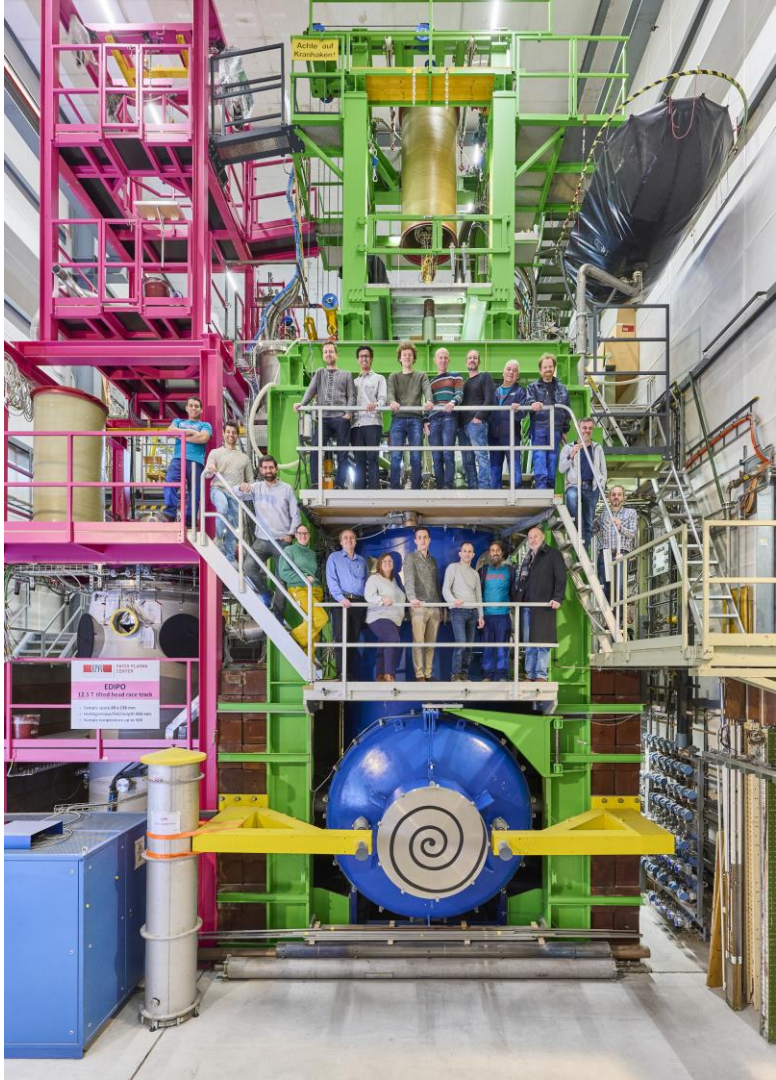
Built-in Flexibility and Versatility of TCV Tokamak



Fasoli et al., Nucl. Fusion 2020

Applied Superconductivity Group

- Testing of superconductors for fusion magnets:
  - Sample assembly (conductors and joints)
  - Sample testing
- Maintenance and upgrades of existing test facilities SULTAN, EDIPO and the smaller one JORDI.
- R&D on fusion-size superconductors within EUROfusion programs:
  - DEMO, VNS, stellarator
  - Quench behaviour in HTS, fusion-relevant samples
  - Quench detection based on non-voltage methods (optical fibers; co-wound superconducting strands; thermocouples)
- Other collaborations, e.g. with Bruker Biospin and CERN



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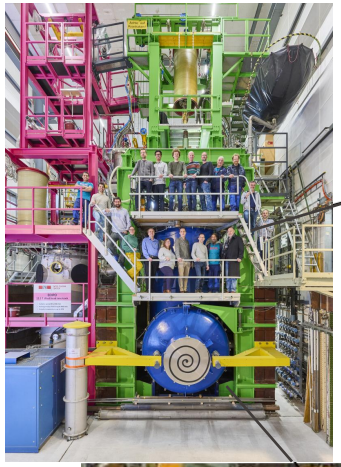
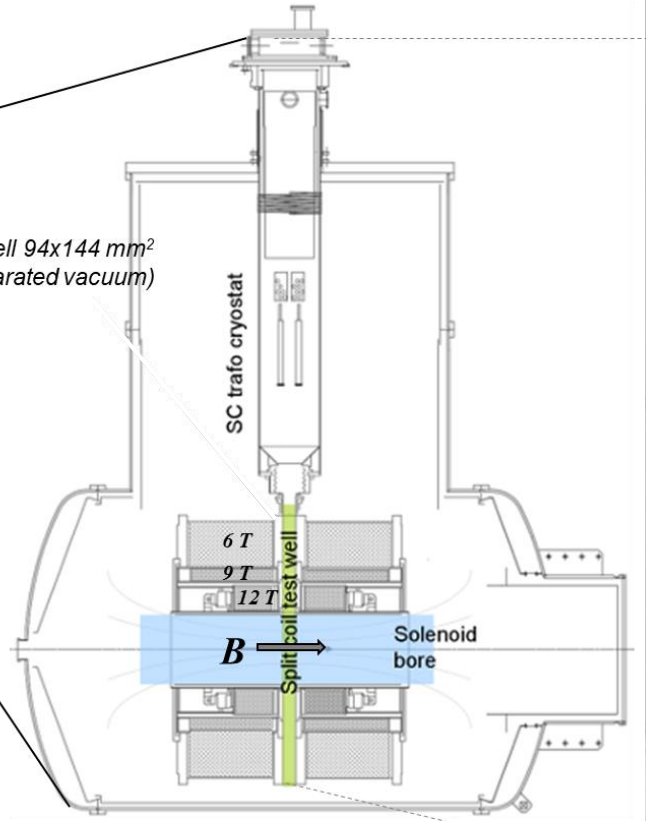
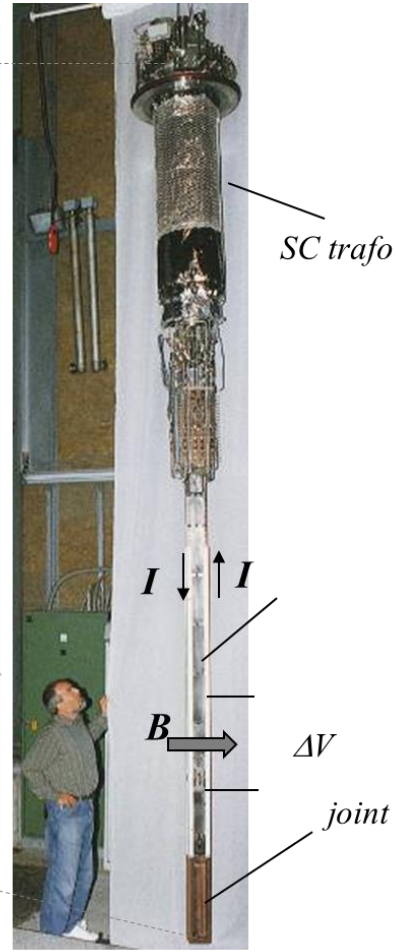
SULTAN Test Facility – DC Field up to 10.9 T







Magnet and sample cooled by forced flow of supercritical He (4.5 K- 20 K)

Tests in SULTAN

	SULTAN	EDIPO II
status	in operation	to be upgraded after accident
Matnetic field	11 T	15 T
Sample space	94x144 mm^2	144x144 mm^2
Temperature	4.5-50 K	4.5-50 K

Possible use of the SULTAN/EDIPO test facilities:

- Test of superconducting cables for fusion magnets (ITER, EU DEMO, CFS, BEST, CFETR, DTT, …) up to 100 kA.
- Test of joints (fusion and accelerator cables).
- Quench experiments (only up to 15 kA).
- Test of sub-size accelerator coils (e.g. Feather HTS magnets for CERN).

Organisatory Comments

Tour to SULTAN Test Facility

Wednesday 14.1. approx. at 17:15 (after the presentations)

guide: Kamil Sedlak.

Kamil Sedlak

Workshop Dinner

- On Thursday 16.1. at 19:00 in **Restaurant Roter Turm in Baden,** Rathausgasse 5, 5400 Baden
- How we get there: by public transportation: bus + train (www.sbb.ch)

18:13 **Villigen, PSI West**

B 357

Richtung Siggenthal-W., Bahnhof

NF GR

18:19 Siggenthal-W., Bahnhof

2' Fussweg Karte anzeigen ›

18:23 **Siggenthal-Würenlingen** **Gleis 1**

S27 1. 2.

Richtung Baden

18:33 **Baden** **Gleis 4**

Workshop Dinner

- ***Menu meat:***
  - *Green salad with house dressing*
    ***
    Chicken breast with herb cream sauce, Potato gratin and vegetables
  - ***
    Chestnut mousse in a glass
  - *CHF 50.00 CHF (excl. drinks)*
- ***Vegetarian alternative:***
  - *Green salad with house dressing*
    ***
    Truffle ravioli with Noilly Prat and chervil sauce and diced pumpkin
    ***
    Chestnut mousse in a glass
  - *CHF 44.00 CHF (excl. drinks)*

Enjoy the Workshop!