PLINIUS is CEA experimental platform for prototypic corium dedicated to the study of nuclear reactor severe accidents. Corium is the mixture that would be form after melting/dissolution of a reactor core. This PLINIUS platform is unique in the EU due to:
- The high temperatures in the 2000-3500 K range
- The use of (depleted or natural) uranium oxides
- The significant masses used (up to 60 kg)

EU-sponsored Transnational Access to Research Infrastructures

The objective of this scheme is to sponsor new opportunities for research teams to obtain access to individual major research infrastructures they require for their work.

Such infrastructures must be rare in Europe, must provide a world-class service essential for the conduct of top quality research, and must typically have investment or operating costs that are relatively high in relation to those costs in their particular field.

The infrastructures must also be able to provide adequate scientific, technical and logistic support to external, particularly first-time, users.

Access is granted to visiting scientists from EU (except France) and Associated Countries (Switzerland, Norway, Iceland, Liechtenstein) so that they can perform experiments in the PLINIUS facility with CEA team.

Access is open both to experienced researchers and to students (MSc, PhD, Post-docs)

Procedure

- 3 Calls for Proposals have been set-up:
  - Leaflets
  - Website
- Submission of Proposals by potential visitors
- Selection by the PLINIUS International Panel
- Visit by 1-3 scientist(s) during ~few days to 1 month to carry out one experiment with facility staff.
- The EU pays all facility operating costs, travel and expenses.
- Visitors may bring specific apparatus to install in our facility.
- The results must be disseminated in the open literature.
- The accesses represent less than 20% of the infrastructure experimental load.

Perspective

A new proposal will be made, jointly with the LACOMECO platform at KIT (Germany), for a Transnational Access project within the EURATOM-China collaboration in Nuclear Fission Research.

Within the PLINIUS FP6 (following a previous FP5 project), accesses to the following prototypic corium facilities have been offered to scientists from European States

Access to COLIMA granted for a SARNET group
Demokritos Institute (GR)
CESIRicerca (IT), CIEMAT (ES)
Retention of prototypical aerosols through concrete cracks
• Fabrication of aerosol from a molten pool with prototypic corium and fission product composition
• Flow through a fabricated crack
• Sampling up- and down-stream of the concrete sample.
• Large retention except for the smallest particles (< 0.4 µm)

Access to VITI granted to KTH (Sweden)
VITI is a multipurpose induction furnace (left picture) to study the behaviour of small masses (0.1 to 50 g) of corium up to 2500-3000 K using aerodynamic levitation and induction heating

Access to VULCANO granted to VTT (Finland)
The EPR ferro-siliceous sacrificial concrete presented a behaviour close to that of traditional siliceous reactor concretes.

Access to COLIMA

The EPR ferro-siliceous sacrificial concrete presented a behaviour close to that of traditional siliceous reactor concretes.

Access to COLIMA

7-stage impactors

Droplet at rest

Compressed droplet

VITI is a multipurpose induction furnace (left picture) to study the behaviour of small masses (0.1 to 50 g) of corium up to 2500-3000 K using aerodynamic levitation and induction heating

- With KTH, PLINIUS team is measuring thermophysical properties of the simulant materials used in the DEFOR and MISTEE facilities at KTH, simulating debris formation due to corium-water interaction in a BWR flooded pit.
- Density, Viscosity & Surface Tension of Bi₂O₃-WO₃ or WO₃-CaO melts