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IMAGE PROCESSING AND DUST TRAJECTORY TRACKING IN TOKOMAKS

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SUMMARY

From 25th February to 30th August 2019, I have done my internship at the Institute for Magnetic fusion research (**Institut de Recherche sur la Fusion par confinement Magnétique, IRFM**).

IRFM is one of the 15 institutes that make up the fundamental research division in CEA (Direction de la Recherche Fondamentale). For almost 60 years, its responsibility has been to carry out research on thermonuclear magnetically confined fusion at the CEA in association with the Euratom Fusion Programme. Since the beginning of the Tore Supra programme in the late 80s, it has been located at the CEA Research Centre of Cadarache in the department of the Bouches-du-Rhône. To fulfil its missions, IRFM gathers three departments (and within them, groups), with various objectives expanding from engineering to physics to platform operation.

The IRFM activities are structured around three main areas:

- Contribute to the implementation of the ITER project and those of the “Broader Approach”,

- Prepare the scientific operation of ITER, through control and experimentation activities, and through theory and modelling,

- Establish the basis for future fusion reactor.

Those activities are closely linked to a special effort in education for the new physicist and engineers in fusion sciences.The IRFM is equipped with several R&D platforms, the best known is the Tore Supra tokamak which is becoming WEST (W – tungsten Environment Steady-state Tokamak) to test the ITER divertor.

The French Alternative Energies and Atomic Energy Commission (CEA) is a key player in research, development and innovation in four main areas:

* defence and security,
* low carbon energies (nuclear and renewable energies),
* technological research for industry,
* fundamental research in the physical sciences and life sciences.

Drawing on its widely acknowledged expertise, the CEA actively participates in collaborative projects with many academic and industrial partners. The CEA is established in nine centres spread throughout France. It works in partnership with many other research bodies, local authorities and universities. Within this context, the CEA is a stakeholder in a series of national alliances set up to coordinate French research in energy (ANCRE), life sciences and health (AVIESAN), digital science and technology (ALLISTENE), environmental sciences (AllEnvi) and human and social sciences (ATHENA).