DR MIREILLE SCHNEIDER

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I am an expert in Integrated Modelling of magnetic fusion devices with an emphasis on Heating and Current Drive processes. For sixteen years I have worked as a physicist of Plasmas and Fusion devices, specialized in simulating fast ions for integrated modelling frameworks. For the last four years I have been actively involved in the development and promotion of the ITER Integrated Modelling and Analysis Suite.

PERSONAL DETAILS:

- **Date of Birth:** 28 November 1977
- **Nationality**: French
- **Gender**: Female
- **Home address**: 289 allée des Micocouliers, 04220 Sainte-Tulle, France
- **Phone number**: +33 628 42 63 37

PRESENT EMPLOYMENT:

I have been working in ITER for 4 years as a **scientific officer** in charge of supporting the analysis of ITER requirements and performance through the coordination of **Heating and Current Drive (H&CD) physics for ITER scenarios** and the **development of the Integrated Modelling and Analysis Suite** by integrating simulation codes and developing tools for fusion plasma scenario simulations. In this context, I have contributed to the **coordination of the work on IMAS development** in ITPAs, IMEG meetings, IMAS code camps and among ITER partners.

CODE DEVELOPMENT:

- Full adaptation of the SPOT, NEMO and RISK codes to the **ITER Integrated Modelling Analysis Suite**, including continuous integration tests.
- Development of tools to facilitate the **population, access and visualisation of the IMAS scenario database**.
- Participation to the extension and update of the **IMAS Data Dictionary**.
- Development of **physics workflows** and **training material** in IMAS.

PHYSICS:

- Scenario modelling for **ITER low activation phase** and **DT baseline scenario**
- Focused **H&CD modelling** for specific scenarios of the ITER Research Plan
- **Coordination of the NBI, ICRH and fusion α heating benchmarks** for ITPAs on Energetic Particles and Integrated Operation Scenarios.

PREVIOUS EMPLOYMENT AND EDUCATION:

- **Permanent position** in the Plasma Heating & Confinement Department (SCCP) of the Institute for Magnetic Fusion Research (IRFM) at CEA, France, as an expert in fast ion modelling of fusion plasmas (2005-2016):
  - Co-developer of the **CRONOS suite of Integrated Modelling codes**
  - Developer of three simulation codes for ions:
    - **SPOT**: orbit following Monte Carlo code for fusion-born alpha particles, NBI ions and ICRF-accelerated ions
    - **NEMO**: narrow beam model for neutral beam deposition
    - **RISK**: flux surface averaged ion Fokker-Planck equation using a finite element method.
  - 8 years of active involvement in the **European Integrated Modelling framework**, where I have further developed the SPOT, NEMO and RISK codes for making them available inside the H&CD workflow and the European Transport Solver.
- **Postdoc for modelling fusion-born alpha particles in tokamaks**, CEA, France (2003-2005)

→ Development of the SPOT orbit following Monte Carlo code for fusion-born alpha particles; study of fusion-born alpha particles in current holes

- **PhD thesis in Particle Physics**, CPPM, Marseille, France & DESY Hamburg, Germany (2000-2003)
  → Search for W integration events with isolated leptons and missing transverse momentum in positron-proton collisions with the H1 detector at HERA
- **MSc (level 5) Subatomic Physics, Modelling and Instrumentation**, Strasbourg, France (1999-2000)
  → INTERNSHIP: study of the characteristics of the Micro Gap Wire Chamber and its charge resolution (1999, IRES Strasbourg)
- **MSc Physics**, Caen, France (1998-1999)
  → INTERNSHIP: study of electromagnetic interferences in particle detection devices (1999, LPC Caen)
- **BSc Physics and Applications**, Limoges, France (1997-1998)
- **H.N.D Physics Measurements**, Caen, France (1995-1997)
  → INTERNSHIP: mounting detection chains for Nuclear measurements ; writing a training booklet on Nuclear Physics and associated detectors (1997, La Hague)
- **Baccalauréat in Science**, Chartres, France (1995)

KEY SKILLS:

COORDINATION:

- **Official coordinator between the ITER Science and H&CD divisions**
- **Coordination of multiple joint modelling activities for ITER scenario modelling in ITPAs**
- **Coordinating H&CD benchmarks in ITPAs**
- **ITER co-chair for the ITPA Coordinating Committee.**
- **IMAS representative for the ITPA on Integrated Operation Scenarios**
- **Workshop organisation for ICRH scenarios in the ITER Research Plan**
- **Conducted multiple trainings (on IMAS, on Integrated Modelling, on Monte Carlo simulations) in ITPAs, IMEG, IMAS codes camps and for the Master/Erasmus programme**

PHYSICS:

- **Ion Fokker-Planck modelling**
- **Integrated Modelling of fusion plasma scenarios**
- **Monte Carlo and flux surface average techniques**
- **Fusion born alpha particles**
- **Neutral beam injection**
- **Ion Cyclotron Radio Heating**
- **Electron Cyclotron Resonance Heating**
- **Quasilinear diffusion theory**
- **Interaction between ions and ICRH / LH waves**

COMPUTING:

- **Languages:** Fortran 95, Python, Matlab, Shell, C, IDL
- **Graphics and Integrated modelling software:** Tkinter, Kepler
- **Continuous integration software:** Bamboo and Jenkins
- **Version control systems:** GIT, SVN and CVS
- **Collaboration software:** JIRA, Gforge
- **Operating Systems:** Linux, Windows
- **Microsoft office:** Word, Excel, Outlook

SPOKEN LANGUAGES:

FRENCH (mother tongue), **ENGLISH** (fluent), **GERMAN** (basic)

SELECTED PUBLICATIONS:

- **Modelling one-third field operation in the ITER pre-fusion power operation phase,** Nuclear Fusion (2019), Vol. 59, Issue 12

- **ICRF heating schemes for the ITER non-active phase,** EPJ Web of Conferences 157, 03046 (2017)
- **A rapid fast ion Fokker-Planck solver for integrated modelling of tokamaks,** Nuclear Fusion (2015), Vol. 55, Issue 1
- **Simulation of the neutral beam deposition within integrated tokamak modelling frameworks,** Nuclear Fusion (2011), Vol. 51, Issue 6
- **Self-consistent simulations of the interaction between fusion-born alpha particles and lower hybrid waves in ITER,** Nuclear Fusion (2009), Vol. 49, Issue 12
- **On alpha particle effects in tokamaks with a current hole,** Plasma Physics and Controlled Fusion (2005), Vol. 47, Issue 12, 2087-2106

RELEVANT PRESENTATIONS IN INTERNATIONAL TECHNICAL MEETINGS:

- IMEG, December 2019: "**The IMAS Python H&CD workflow**"
- ITPA IOS, October 2019: "**The IMAS Python H&CD workflow**"
- ITPA IOS, April 2019: "**Status of IMAS and the Scenario Database**"
- ITPA EP, April 2019: "**Fast ion distributions in IMAS**"
- IMEG, November 2018: "**Demonstration of IMAS usage on new ITER cluster**", "**Update to H&CD modelling capabilities in IMAS**"
- ITPA IOS, May 2018: "**Recent progress on IMAS Scenario Database**"
- IMEG, December 2017: "**Improved H&CD capabilities in IMAS**". "**Data processing and Live visualization**"
- ITPA IOS, October 2017: "**Progress on IMAS Scenario Database**"
- ITPA IOS, April 2017: "**Recent progress on IMAS capabilities**"
  "**Density validation & control and associated diagnostic models in IMAS**"
- ITPA EP, April 2017: "**New status of the H&CD workflow in IMAS**"
- ITPA IOS, October 2016: "**Catalogue for integrated scenarios and experimental database**".
  "**Integrated scenario modelling with METIS in IMAS**", "**Status of NBI benchmark activity within IMAS**"
- ITPA TC, October 2016: "**Using IMAS for benchmarking transport models**"
- ITPA EP, October 2016: "**Benchmarking distribution of Energetic Particles by comparing auxiliary heating and α models**"
- IMEG, September 2016: "**How to adapt a physics code to IMAS**"
- ITPA EP, June 2016: "**Status of NBI benchmarks in ITPAs and IMAS**"
- ITPA IOS, April 2016: "**Heating and Current Drive Modelling in IMAS**"

LATEST CONFERENCES:

- 27th IAEA Fusion Energy Conference, Ahmedabad, India, 2018; invited talk:
  "**Modelling one-third field operation in the ITER Pre-Fusion Power Operation phase**"
- 45th EPS conference, Prague, Czech Republic, 2018; plenary talk:
  "**Heating and Current Drive Systems in the ITER Research Plan**"
- 44th EPS conference, Belfast, Ireland, 2017; poster:
  "**Heating scenarios for the new staged-approach of the ITER Research Plan**"
- 22nd RF Topical Conference, Aix-en-Provence, France, 2017, poster:
  "**ICRH scenarios for the ITER non-active phase**"

REFERENCES:

- **Simon Pinches**, Section Leader in Plasma Modelling and Analysis Section, ITER, France
- **Frédéric Imbeaux**, Deputy of Plasma Heating & Confinement Department, CEA/IRFM, France
- **Thomas Johnson**, Coordinator of the EU-IM sub-project "Heating, Current Drive and Fast Particles", KTH Stockholm, Sweden.
- **Lars-Göran Eriksson**, Senior Expert in Magnetic confinement fusion energy research, European Commission, Brussels, Belgium