

Riccardo Agnello

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CURRENT RESEARCH ACTIVITIES

Researcher at the Neutral Beam Test Facility in Padova - Italy (2020 - ongoing)

I am currently working at the **Neutral Beam Test Facility** (NBTF) in Padova (Italy) as **Physicist** for NBTF Diagnostics.

NBTF is a key infrastructure required for the experimental nuclear fusion reactor **ITER** and it consists of two leader experiments: **SPIDER**, the full-scale negative ion source, and **MITICA**, the full-scale heating neutral beam injector for ITER. The undergoing researches at the NBTF facility are of paramount importance for the success of ITER.

My main functions and responsibilities as Physicist at NBTF are :

- Contribute to the final development of SPIDER diagnostics, including integration and commissioning
- Develop data visualization and analysis tools
- Participate in the NBTF experimental campaigns
- Take responsibility of specific subsystem or research topics
- Provide full support for best exploitation of the diagnostic system

I also participate to the experimentation on the small negative ion source NIO1, in the framework of the first demonstrative DEMO reactor.

EDUCATION

Ph.D. in Physics (2016-2020)

École Polytechnique Fédérale de Lausanne (EPFL) – Switzerland

The objective of my thesis, “*Negative hydrogen ions in a helicon plasma source*”, was to advance the understanding of the physics of helicon-based plasma devices to produce negative ions (H^- / D^-) for fusion Neutral Beams Injectors (NBIs) as a possible efficient alternative to inductively coupled plasma (ICP) sources.

I have designed, built and performed experiments on several key diagnostic techniques for fusion (**Cavity Ring-Down Spectroscopy**, **Langmuir probe photodetachment**, **microwave interferometry**, **Thomson scattering** and **magnetic probes**).

I collaborated with the **AWAKE** project at **CERN**, which investigates the possibility to use plasmas to develop compact and efficient particle accelerators. I installed and successfully tested a Thomson scattering diagnostic as a proof-of-principle experiment to measure plasma density in helicon plasma cells for AWAKE.

Master Degree in Physics (Nuclear Physics) (2013 – 2015)

Università di Catania

Thesis work carried out at Istituto Nazionale di Fisica Nucleare (INFN-LNS).

Thesis entitled “*Experimental characterization of a microwave interferometer for plasma density measurements in ECR ion sources*”.

Visiting student at the Ohio State University, USA (nov – dec 2014).

Co-supervision of thesis and students’ projects

During my PhD, I have co-supervised: 2 master thesis and 4 “Travaux Pratiques” (one-semester experimental projects).

Teaching Experiences (as teaching assistant)

- Physique Générale I (EPFL, 2017 and 2019)
- Physique des Plasmas I (EPFL, 2017, 2018 and 2019)
- Laboratoire de Physique I (EPFL, 2016)
- Fisica Generale II for Mechanical Engineering (Università di Catania, 2015)
- Fisica Generale I for Mechanical Engineering (Università di Catania, 2014)

Scientific Activities

I am co-author in more than 50 publications and first author in 5 publications. (Apr. 2022).